Journal OF THE AMERICAN DIETETIC ASSOCIATION

VOL. 24, NO. 5 MAY 1948

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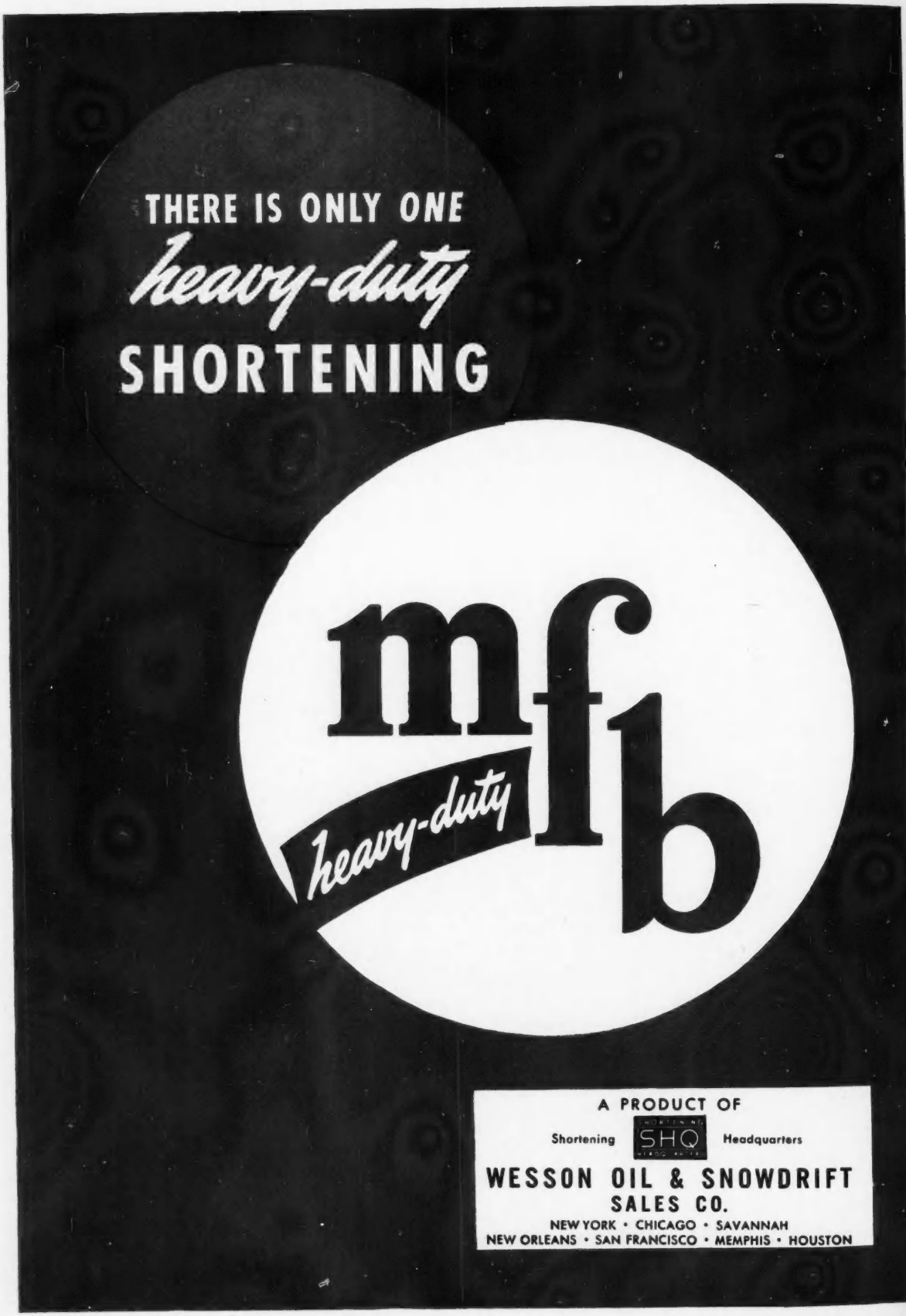
A. D. A. Annual Meeting, Boston, October 18-22, 1948

Published by THE AMERICAN DIETETIC ASSOCIATION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VOLUME 24
NUMBER 5

Journal OF THE American Dietetic Association

Publishing Office
Mt. Royal and Guilford Aves.
Baltimore 2, Md.

American Dietetic Association
620 N. Michigan Ave., Chicago 11, Ill

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The Journal of the American Dietetic Association is published monthly by the American Dietetic Association, Mt. Royal & Guilford Aves , Baltimore 2, Md., and 620 N. Michigan Ave., Chicago 11, Ill. Neither the Association nor the Editor assumes responsibility for the opinions expressed by authors of papers abstracted, quoted, or published in full in this Journal.

Subscriptions: Rates $5 per year. Special rate to undergraduate students and dietetic interns, $1.50 per year, if order is approved by head of the department. Single copies 75 cents. All correspondence concerning Journal subscriptions, orders for copies or reprints from the Journal, and notices of change of address should be sent to the American Dietetic Association, Mt. Royal & Guilford Aves., Baltimore 2, Md., or 620 N. Michigan Ave., Chicago 11, Ill. Notices regarding change of address should reach the publisher two weeks before the date of issue on which the change is to take effect and both old and new addresses should be given.

Editorial Correspondence: All articles and notices for publication, general correspondence, and inquiries should be sent to the Editor at the American Dietetic Association, 620 N. Michigan Ave., Chicago 11, Ill. Manuscripts are accepted for publication on condition that they are contributed solely to the Journal. Copy must be double-spaced and original, not carbon, submitted.

Advertising: All correspondence concerning advertising should be addressed to the American Dietetic Association, 620 N. Michigan Ave., Chicago 11, Ill.

COPYRIGHT, 1948, BY THE AMERICAN DIETETIC ASSOCIATION Printed in U.S.A.
Entered as second-class matter June 30, 1925 at the Post Office at Baltimore, Md., under the act of August 24, 1912
Published Monthly by The American Dietetic Association

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Historical Background for the Nutritional Treatment of Metabolic Diseases[1]

JOHN R. MURLIN, M.D.

Professor Emeritus of Physiology, University of Rochester, and Former Editor, Journal of Nutrition

UNDER the shadow of the great pyramid of Cheops in Egypt there is an ancient tomb on whose sculptured walls are plainly portrayed the grinding of flour, mixing and baking of bread, brewing of beer, slaughtering of cattle and poultry, and methods of cookery. This tomb is at least 5000 years old (1).

To the Egyptians of this period, writing on stone with a chisel was the only means available to transmit knowledge of their habits of life to their posterity. In the story portrayed on the tomb we have the beginning of the history of nutrition. The breaking of bread and methods of cookery are of interest to all nutritionists and dietitians. Reminding you of the ancient and honorable origin of your science as portrayed 5000 years ago, we might appropriately say, in the words of Napoleon Bonaparte to the soldiers of France at the battle of the pyramids, "the centuries look down upon you."

Much later the Egyptians developed the use of the papyrus plant in the form of thin sheets of fiber obtained by soaking, pressing, and drying the pith of the plant. Writing with a stylus dipped in some kind of permanent dye on this crude paper, they employed a sort of combined alphabet and shorthand and thereby described scenes and practices of their time, depositing them in the tombs of important personages. One of the oldest papyrus letters of antiquity believed to date from some 2000 years B.C. was sent from Lower Egypt to Thebes where the writer had left his son in charge of a great temple. He admonished the son, "You must give victuals to my people while they are doing work; mind this. And make the most of all my lands, dig the ground with your noses in the work. Be very active and remember you are eating my bread" (1).

EARLY PHYSIOLOGY

Before the days of Hippocrates four cardinal elements of nature were recognized—air, fire, water, and earth. Medical tradition, in turn, had identified four so-called cardinal humors or fluids of the body with these four cardinal elements of nature. They were: *blood* corresponding to air, hot and moist; the *yellow bile* or *choler*, corresponding to fire, hot and dry; the *phlegm* or *pituita* (supposedly secreted by the brain which drained through the nose) corresponding to water, moist and cold; and *black bile* (melancholy) corresponding to earth, dry and cold.

The belief was that excess of one of these humors in the temperament caused an idiosyncrasy. A patient was classified as sanguine, choleric, phlegmatic, or melancholic, according to which humor dominated him. The main reason why these conceptions prevailed in medical thought for some 2000 years was that the Greeks frowned on dissections even of dead bodies, at least until the time of Galen in the second century A.D., and vivisections were obviously forms of cruelty which were taboo from the beginning of the Christian era. Of course, anesthetics were a long, long way in the future. Even Galen did not learn much physiology from his dissections, and it was not until men began to observe nature directly, instead of citing the ancients for their authority—in other words, not until the renaissance of learning in the fifteenth century—that newer concepts were formulated.

Fernel's Concepts

One of the men who deserves most credit for upsetting antiquated notions about the body and the healing of the sick was Jean Fernel, a French physiologist and physician born at Montdidier in 1497—just five years after the discovery of America. He had a noted career, and evidently performed many animal experiments and did numerous dissections of the human body. A book entitled *The Natural Part of Medicine* was published by Fernel in 1543—the same year that Copernicus from Poland issued his famous *De Revolutionibus*, proving that our earth is not the center of the universe but only a satellite of the sun.

[1] Presented at the 30th Annual Meeting of the American Dietetic Association in Philadelphia, on October 17, 1947.

Here are a few passages from Fernel, voicing the spirit of the French Renaissance. "Many tell us that the art of healing, discovered by the labors of our forefathers, and brought to completion by dint of reason, has now attained its goal. They would have us, who came after, tread in the same footsteps as did the past. It were a crime, they tell us, to swerve a hair's breadth from the well established way. But what if our elders, and those who preceded them, had followed simply the same path as did those before them? . . . .

"This age of ours sees art and science gloriously re-risen after twelve centuries of swoon. . . . Our age today is doing things of which antiquity did not dream. . . . How efficient today is the printing press for the diffusion of all kinds of learning. . . . The continent of the West, the so-called new world, unknown to our forefathers, has in great part become known. A new globe has been given us by the navigators of our time," and so on. As Sir Charles Sherrington points out in his recent book called *The Endeavor of Jean Fernel*, these expressions show that the Renaissance was speaking with "the same gusto as the Elizabethan voice" in England (2).

Fernel in his *The Natural Part of Medicine*—renamed in the second edition simply *Physiology* (the first use of that name, by the way, for the title of a book)—challenged the whole concept of the humors controlling every function of the body. The four humors, he declared, are "not strictly parts of the body. They are merely contained in the body."

Fernel took up with the contemporary teaching of the three "coctions." Literally, this word means "cookings." We have it in our word "decoction," meaning a method of boiling out the essence of a substance, such as coffee or hellebore. But in Fernel's use of the word, it meant merely "a change of state." The first "coction," he said, means the conversion of food to chyle, i.e., complete digestion. The second or "great coction" means the manufacture of blood from the chyle. The third, broadly speaking, means the becoming of flesh from materials supplied by the blood.

Fernel developed his ideas of the faculties of the soul or psyche and one of them, the most primitive of all, he called the "nutritive" faculty. It is this faculty, he said, which works or causes the first coction. What he seems to have meant is that not only the mind but the whole body has a sort of instinct for nutrition (2).

Theories of von Helmont

But advance in observation of the inner processes of the body was still very slow even in the Renaissance. We must leap over another century to find the next definite expression of improved conceptions. Jean Baptist von Helmont, born in Brussels in 1577, was something of a chemist. He performed experiments with animals, giving them food and then examining their organs at different times after feeding. From what he learned he thought the teaching of Fernel did not go far enough. He propounded and maintained that there are not three but six "concoctions," or digestions, which the food undergoes. The first takes place in the stomach, food and drink being therein converted into chyme by means of a "ferment" (von Helmont was the first to introduce this idea, based on the fermentation of yeast by which alcohol is produced). He noted that this fermentation takes place in an acid medium. The chyme passing into the duodenum acquires a saline nature. Here, there is a greater vigor of transmutation and the ferment which accomplishes this "second concoction" (digestion) is furnished by the bile. (Since his observations were made on dogs, where the bile and pancreatic juice enter the intestine close together, this error is not to be wondered at, for the bile has color while the pancreatic juice is clear.)

The third digestion is that of sanguification, which beginning in the mesenteric veins, is continued in the liver and completed in the vena cava. There are two ferments for this third transformation both supplied by the liver.

The fourth concoction takes place in the heart by which the dark blood of the great veins is converted to the bright red blood of the arteries. The crude blood he says has now become vitalized blood. (Here he missed completely the passage of blood through the lungs, believing as did all other authorities, until Harvey, that the blood passes through invisible pores in the septum between the right and left ventricles. Although Harvey was von Helmont's contemporary, the latter either had not heard of his demonstrations, or ignored them.) The fifth digestion or concoction of von Helmont is only a continuation in the arteries of the vivification of the food materials in the blood which was begun in the heart.

The sixth and last concoction takes place, in the "kitchens" of the several members of the body—in other words, in the tissues themselves—and is accomplished by a ferment peculiar to each tissue.[2] In modern language, all tissues derive their sustenance from the common blood, the appropriate transformations being made through the agency of enzymes supplied by themselves (3). Put this way, all of us could accept von Helmont.

It is clear that von Helmont regarded all these changes as chemical in nature and thus he visualized changes which we describe by our word "metabolism."

But what happens to food beyond the gastrointestinal tract?

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[2] Note the use of the word "kitchens" for what we might call the "laboratories" of the members of the body. Laboratories grew out of kitchens, we must remember, and the use of the latter, is evidence that the distinction was not yet clearly made.

It is a singular fact that the final disposition of food and its ultimate purpose were understood long before the discoveries of the many intermediary steps from digestion to combustion. Following the historical sequence for the next great advance in formulating concepts which we can accept today, we must jump ahead two centuries and more to the discovery of oxygen by Priestley, an English Unitarian minister, in 1774 and to the explanation of its importance to living organisms by Lavoisier, the great French chemist, in 1777. Both of these pioneers were so far ahead of their times that the one was driven from his country by religious and political persecution after his workshop and library were burned and the other in the same year (1794) was beheaded at the guillotine (4).

Lavoisier's Experiments

Lavoisier measured the rate of combustion in the human subject; and, if he had not been hauled off to the execution block, he would almost certainly have demonstrated what we now call the conservation of energy in the living body—some sixty years before that principle in physics was formulated by von Mayer and Helmholtz and over one hundred years before the demonstration by Rubner that the principle holds for the living organism. He had already shown that a guinea pig produced 226 grains of carbon dioxide in 10 hr. With LaPlace, he invented an ice calorimeter and by this means showed that another guinea pig gave off heat enough to melt 13 oz. of ice in 24 hr. They estimated on the basis of the first experiment that an amount of carbon necessary to produce 226 grains of carbon dioxide would have caused only 10.4 oz. of ice to melt. Here was a discrepancy which Lavoisier thought must be due to union of oxygen with hydrogen to form water, and it was this problem he was trying to solve when he was arrested and sent to jail to await his execution. He had an impervious bag made to enclose the whole human body except the mouth, and his assistant, Seguin, who later became a distinguished scientist, was encased in this bag breathing into potash solution to collect the carbon dioxide. Lavoisier expected to find most of the water of combustion coming from the skin and this would be collected by the bag. With this part accounted for, we may be pretty sure he would have looked in the expired air for the rest, and then he would have had the data to compute the heat generated in the formation of this water. Applied to the guinea pig, the calorimeter would then have shown that the animal gave off the correct amount of heat for the two combustions. Thus, the foundation would have been laid for the conservation-of-energy law.

Lavoisier begged for more time to complete his experiments, but in the language of the revolutionaries, "France had no use for savants" (4).

Liebig's Work

Nobody immediately following Lavoisier was wise enough to apply to physiology what he had learned about combustion. The reason is that nobody knew anything precisely about the composition of foods.

For this information we must now turn to Germany where Justus von Liebig, the first organic chemist, was at work. Liebig had gone to Paris in 1823 to work with Gay-Lussac, who in turn had been an associate of Lavoisier. At the age of twenty-one, Liebig became Professor of Chemistry at Giessen. Professor Karl Thomas, formerly of Leipzig, (driven from Leipzig by the Russians, he is now at Erlangen in Bavaria) says of Liebig, "we physiologists honor him as the analyst, who with his own methods, first systematically investigated the organs of plants and of animals as well as their feces, urine, and bile. He established the protein content of legumes and cereals and called attention to the fact that they possess among themselves and with the albumins of the animal world almost the same elementary composition. . . . He separated the nitrogenous from the non-nitrogenous organic foodstuffs and emphasized the fact that the same substances occur in our foods and as constituents of our bodies and that the latter arise from the former" (5).

Voit's Observations

Liebig moved from Giessen to Munich as Professor of Chemistry in 1852, and the same year a young man, Carl von Voit by name, who was to become Liebig's most famous pupil, enrolled at the medical school of the same university. He graduated in 1854 and *then* began advanced study of physics, zoology, anatomy, and chemistry—a most unusual procedure. Voit was inspired by his studies under Liebig, but he accepted an appointment in physiology with Bischoff and became full professor in 1863 at the age of thirty-two.

His first great discovery was the proof that the nitrogen of the food of the adult under proper conditions is accounted for by the nitrogen of the feces and urine, within 0.3 per cent; that muscular work is not done at the expense of protein, as Liebig had supposed; and that carbohydrate spares protein (i. e., reduces the amount of protein necessary for nitrogen equilibrium). With an apparatus designed by the physicist Pettenkofer and known by his name, Voit and Pettenkofer studied simultaneously the respiratory and protein metabolism of dogs and men, publishing seven long papers, between 1866 and 1873, which Lusk says became classics and "represent the beginnings of the modern science of nutrition" (1). They established for all time that the requirement for protein is dependent only on the organized mass of the tissues, while the requirement for fat and carbohydrate is dependent on the physical activity of the body.

Already how differently the medical man could look at his patient and think of what Voit had learned. Soon Voit had trained a man in his own laboratory who could make such applications. His name was Friederich von Müller, one of the greatest medical men Germany ever produced.

The most distinguished pure scientists among Voit's pupils were Max Rubner and Graham Lusk—the former at the University of Marburg and later at the University of Berlin, the latter at Yale University, New York University, and finally, at Cornell University Medical College. Both made important contributions to the subject of animal and human calorimetry with which every student today is acquainted.

Rubner and His Successors

Here is a brief review of Rubner's work. He proved that the heat actually produced by a dog is completely accounted for by the energy liberated by the foodstuffs oxidized, and by so doing established the validity of the law of the conservation of energy for the animal body—in other words, the direct heat measurement agreed with the indirect calculation of the heat from the oxygen absorbed and the protein broken down. Rubner established the physiological heat value of many foodstuffs by deducting the bomb heat value of urine and feces resulting from each kind of food fed, from the bomb heat value of the food as eaten. He discovered that the resting heat production is much more nearly proportional to the surface area of the body than to body weight. He discovered the characteristic increases in heat production over the basal rate caused by the ingestion of protein, fat, and carboydrate separately and gave the name *specific dynamic action* to this increase, or S.D.A. for short. The expression "thermogenic effect" also is used as being synonymous with S.D.A.

W. O. Atwater studied in Voit's laboratory, as well as in several others in Germany. From what he had seen and learned, he decided to construct a direct-indirect calorimeter for study of the energy metabolism in man. This was built at Wesleyan University, where he was Professor of Chemistry, with the help of Rosa, the physicist, and results began to be published just at the turn of the century. They obtained agreement between direct and indirect heat measurements which, as the average of forty experiments, was within 0.2 per cent. This was the same difference Rubner obtained in forty-five experiments on dogs. Thus, the law of the conservation of energy applies to man as well as the dog.

F. G. Benedict worked with Atwater and became his successor in charge of the calorimetric work, which in 1906 was moved to Boston to occupy the new Carnegie Laboratory. The calorimeters were greatly improved and with the help of several collaborators and especially T. M. Carpenter, Benedict accomplished an enormous amount of work on fasting, on prolonged restricted diets, on the effects of alcohol, in children from infancy to puberty, in diabetes, and in pregnancy; on the effects of many kinds of exercise, and on many different species.

Benedict terminated his professional career with the publication of his monograph entitled *Vital Energetics* in 1938. In it he presented a very critical and stimulating comparison of the different modes of evaluating basal metabolism for a large number of species of warm-blooded animals ranging in size from a dwarf mouse weighing 8 gm. to an elephant weighing 3,672,000 gm. He found that with different species in the same weight group, there are great differences in the total heat production as well as in the metabolism expressed per kilogram or per square meter of surface. A horse, for example, has a higher metabolism by either mode of expression than has a cow or a bull of the same weight. Sex differences traceable to hormone influences are found for the bovines as well as for men and women, and there is a hint of it in the adult pig and goat. While conceding that, for the prediction of basal metabolism in man, calculation by calorie per square meter per hour (called by Boothby the basal metabolic rate) is extremely useful, Benedict maintains that we must not suppose that it is a universal law for all warm blooded animals, even though the body surface is correctly measured. There are too many differences in body form, in eating habits, in mean body temperature, in body covering, and so on, to expect absolute uniformity.

Lusk's Contributions

Lusk's calorimeters—one for dogs or infants in the Cornell Medical School and one for men both healthy and sick, under the direction of E. F. DuBois at Bellevue Hospital initially and later at New York Hospital—were constructed after the design of Rosa and Benedict with minor improvements made by H. B. Williams.

Lusk gave his attention for many years to the S.D.A. or thermogenic effect of foods, carrying out the study of proteins, fats, and carbohydrates separately in hourly periods so long as there was any increase above basal. His results corrected, for the dog, the conclusion that Rubner had reached, namely that fat had a larger thermogenic effect than carbohydrate. But the important addition to knowledge was that the thermogenic effect varies with the stage of digestion. It rises most rapidly after carbohydrate feeding, next after protein, and most slowly after fat—as we should expect from the relative speed with which these three classes are prepared by digestion for absorption and by differences in diffusibility of the end products. S.D.A., in other words, cannot be correctly expressed by a single figure representing percentage above basal, but must be shown by a time curve.

Lusk undertook to account for the thermogenic effect of proteins by feeding the single amino acids and their intermediary products; but he was ahead of progress in the analysis of the amino acids of proteins and of knowledge regarding the exact intermediary processes in each case.

Other Work on Energy Metabolism

Here we should also call attention to the contribution of E. B. Forbes and his associates at Pennsylvania State College. Swift and Black, in particular, have shown with the white rat that the thermogenic effect of a mixed meal cannot be correctly calculated from the individual effects of its constituents determined singly, as Lusk thought should be true.

Using a bed calorimeter, DuBois' direction accomplished a great amount of very precise work on the energy exchanges in many kinds of disease: typhoid fever, tuberculosis, erysipilas, arthritis, hyper- and hypothyroidism, hypo- and hyperpituitarism, diabetes, obesity, and many others. These results have been of great value in adjusting diets to the sick man, so as to prevent so far as possible, undue loss of weight, prevent the occurrence of ketosis and other disturbances to acid base balance, to keep up a reserve of glycogen in the tissues, and so on. DuBois became Professor of Medicine at Cornell University with a background of experience in scientific work not unlike that of Friederich von Müller.

One other citation must suffice in this story of the progress of energy metabolism in the United States. Brody, at the University of Missouri, has written a most stimulating book based to a considerable extent on his work with farm animals, entitled *Bioenergetics and Growth* (6). One of his major contributions in this book is his emphasis on "homeostasis," a new term introduced by Cannon a few years ago, for what Claude Bernard called the ability of the body to maintain its internal environment. The maintenance of constant body temperature is an illustration. The maintenance of a constant body weight or constant basal metabolism in adult life, which many people accomplish unthinkingly are others.

Several mechanisms are involved in this maintenance of body weight, as Brody points out: (a) The more food we consume, the less efficiently it is digested and utilized, while the less we consume the more efficiently it is handled. (b) The higher the body weight becomes, the larger the proportion of food which must be used for maintenance, leaving less for deposit. The lower the body weight becomes the less is deducted from the food for maintenance, leaving more for deposit. (c) It was shown by Lusk and Anderson in 1917 that a dog running on a treadmill in the calorimeter had a greater energy expense, leaving less for his muscular work, when he was overnourished than when he was lean. (d) Farmers know how much more grain it costs to put the last hundred pounds of fat on a steer, than the previous hundred pounds. This illustrates the law of diminishing returns.

PROTEIN METABOLISM

In these days we are becoming more and more aware of the quality of our foods. The emphasis on preservation of the vitamin content is an illustration. In fact, it is vitamin richness or leanness we have come to think of first in judging the quality of a food or a diet. But the government won't permit the addition of vitamins to a new food product, for the very good reason that it does no good to add vitamins beyond the body's needs, for then they are excreted and wasted.

Just at present, it is the quality of proteins which is in the forefront. A great advance was made when Karl Thomas introduced the so-called biologic value method in 1909. It was adapted to the rat and improved by H. H. Mitchell in 1924. This consists in first determining the wastage of protein (expressed as nitrogen) from the body when a diet contains the least amount of protein possible, but supplies adequate calories, minerals, and vitamins. This excretion of nitrogen is called "endogenous," because only a minimal fraction of it comes from the food; practically all is from the body tissues. Each of the proteins is then fed with the same basal diet at a level estimated to give nitrogen balance or something below this. To obtain the amount absorbed, the difference in fecal nitrogen when the protein is fed and when none (or only traces) are fed is deducted from the nitrogen of the protein. The difference in the nitrogen of the urine when protein is fed and when it is not fed gives the amount of nitrogen retained. The percentage of the absorbed nitrogen then, which is retained, is the biologic value. There is going on now a large cooperative program to evaluate six pure proteins on different animal subjects—the same six from the same lots for all subjects. There are about twenty laboratories engaged in this part of the work, and a dozen more are engaged in analyzing these same proteins for their amino acid compositions. We at Rochester finished a few weeks ago a study of the biologic value of these proteins on human subjects. All the proteins were fed in the form of dry powders suitably cooked to make them palatable. The biologic values as averages from seven to ten subjects came out in the following order: whole egg, highest; egg albumin, next; then casein; beef; peanut flour; and wheat gluten, lowest of the six. This is our first publication of the results. The finished paper will, we hope, appear before long. It is hoped also that when all the results from the different laboratories are available, there will be satisfactory agreements, so that methods can then be standardized and followed for many other proteins.

To summarize some of the advances made in the

growth of nutritional knowledge from Lavoisier to the present time—a span of 170 years: (1) combustion in the body as the source of energy (heat); (2) the classification of foodstuffs, the same classes occurring in our foods as in our bodies, and the origin of the latter from the former; (3) the requirement for protein dependent on the mass of organized tissue and the requirement for fat and carbohydrate on the physical activity of the body; (4) the agreement between the heat as calculated from the respiratory and protein metabolism, with the heat given off and measured as such; (5) the physiological heat value of foods based on the sums of single values for their organic components; (6) the surface area principle in basal metabolism; (7) the specific dynamic action, S.D.A.; (8) the influence of fasting and restricted diets; (9) the influence of age and sex on requirements for energy and protein; (10) the time curve of the S.D.A.; (11) the lack of summation from mixed meals of the separately determined S.D.A.'s; (12) the influence of fevers and of specific hormone deficiencies and excesses on various kinds of metabolism; (13) the principle of homeostasis; (14) the biologic value of proteins; and finally, (15) the vitamins (for which there has been no time in this story).

To illustrate the importance of this wealth of knowledge, so inadequately summarized, I have selected only three abnormal conditions for its application: undernutrition, obesity, and diabetes. The first two may be the result of endocrine disturbances or simply the breakdown of homeostasis; the last-named is due in part to overeating, causing overstrain of the insulin-producing tissue, in part to hereditary deficiency in this tissue.

UNDERNUTRITION

Undernutrition may be exogenous or endogenous (7, 8), the former due to aversion to or hysterical fear of food, the imbalance between intake and expenditure of energy being outwardly produced. The latter is due to an imbalance occasioned by the excessive production within the body of a hormone-like thyroxin (Grave's disease), or to the deficiency of adrenal cortical hormone (Addison's disease), or to anterior pituitary hormones (Simmond's disease). In all three conditions, the expenditure of energy exceeds the subject's capacity to eat sufficient food. Obviously, the endocrine disturbance must be eradicated before the dietitian can do anything for such patients. Once this is accomplished, the provision of adequate calories, protein of high value, and vitamins and minerals to restore the metabolism to normal brings rapid restitution to health.

To return to exogenous undernutrition, it is a curious phenomenon that the extent of loss of weight in chronic undernutrition sometimes is greater than would be produced by absolute fasting, though, of course, fasting reduces weight much more rapidly. In total starvation, the basal caloric production declines much more rapidly than does body weight, so that at the end of thirty to forty days, it is approximately one-half as much per kilogram, say seventeen instead of thirty-four calories, as at the beginning of the fast. In chronic undernutrition, it is frequently found that the basal metabolism is normal, or nearly so, even after loss of more than half the normal body weight.

A similar principle of conservation applies to protein metabolism. Like the energy metabolism, it undergoes at first a sharp increase at the beginning of fasting. But when starvation, or particularly when chronic undernutrition, has reduced the protein of the tissues extensively, then the ingestion of very small amounts of protein, which under normal circumstances could not prevent protein loss, now does so.

This is another illustration of homeostasis. In spite of the apparent determination of the unhappy people who never experience the pleasures of eating to starve themselves slowly to death, nature conspires to keep their systems ready to resume normal nutrition in a very short time after they can be persuaded to eat enough. After total starvation, the picture is very different. Such subjects must be fed very carefully for a time, until the digestive glands can resume function and the organs of intermediary metabolism, notably the liver, can again work up the necessary complement of enzymes.

Many people, however, are able to maintain perfect health even though they appear to be below that which is normal weight-for-height for the average person. The "sthenic" type, as McLester and others call these really rugged-though-thin people, has "a normal resistance to disease, a well-balanced nervous system and emotional poise" (8). Lean people who do not have these latter characteristics belong to the "asthenic" type. They lack both physical and mental stamina. They have obvious physical defects, such as narrow chest, marked enteroptosis and gastrointestinal disorders. Because of poor digestion, they are afraid to eat, which leads to greater weakness, and this in turn leads to greater impairment of digestion. To rescue these people, they must be induced to eat. The successful approach may be psychological or physiological. The use of insulin to restore appetite has, in the hands of many wide awake clinicians, been very successful (8).

OBESITY

Obesity results ordinarily from the ingestion of more calories than are consumed. It comes about either from reduced activity or from increased ingestion over the amount necessary to maintain a constant body weight. In an analysis of 350 cases studied by Greene a few years ago, in 67.5 per cent obesity began with reduced activity and only a small percentage with any *history* of increased eating. However, even a small excess of the food con-

tinued over several years—so small as to escape the notice of the person himself—may lead to obesity (8).

There is no reduction in basal metabolism according to any of the standards now in use.

Obesity is classified in the same way as undernutrition: (a) as simple obesity of alimentary origin, or (b) as obesity due to internal factors. The first is called "exogenous" and the latter "endogenous" (7, 8). The imbalance between calories ingested and expended holds for both; but only in the latter type need we speak of a break down in *homeostasis*, This may be a constitutional, i.e., hereditary tendency, (and obesity does run in families) due to some alteration in the metabolic changes intervening between digestion and final oxidation of food, or to endocrine conditions. For example, it was found by Hetényi that no matter what the diet, *the fat of the blood tends to assume a lower level in obese persons than in normals* —just the reverse of what we might expect. When a low caloric diet was given, the level of fat in the blood fell 18 to 43 per cent in the obese persons while in the normal person it remained essentially constant as does blood sugar. In the obese person there evidently is an abnormally rapid withdrawal of fat from the blood to the tissues, while the withdrawal of fat from the fat deposits is resisted (8). These facts, according to Wilder, may explain the delayed sense of satiety and the abnormal desire for carbohydrates frequently experienced by obese people (9). If this is where the principle of homeostasis breaks down, it might be a rewarding project to study the possibility of injecting into the blood some physiological substances which conceivably might retard the rapid withdrawal of fat from the circulation.

Obesity often results when appetite is regained after a long period of illness or after long periods of enforced undernutrition from lack of food. Grafe relates that in Germany after World War I there was an enormous increase in obesity between 1924 and 1926 when food again became plentiful. The same phenomenon doubtless will be observed in European countries as soon as normal conditions of food supply are established. Don't let us get the idea, however, that we are being asked to deny ourselves to make our former enemies, or even our friends, in Europe obese. The chances are that the abundance of food which will be reflected in a large number of obese people will not be reached for several years yet. It was six years after the other war before it was noticed in Germany, and the shortage of food is much greater now than it was two years after that war.

Endocrine Causes of Obesity

There are at least four endocrine disturbances which may produce obesity: deficiency of the thyroid, the pituitary, or the sex gland hormones, and excess of the adrenal cortical hormone. Hypothyroidism leads to myxedema, the name given to the disease by Sir William Gull in 1873. Fat is distributed over all parts of the body. The basal metabolism in these subjects is always below normal, sometimes as much as 40 per cent, as was shown by Magnus-Levy in 1895. A diet which would fall far short of maintaining weight in a normal person makes these persons obese. Administration of thyroid substance or of the pure hormone very rapidly takes off the excess fat and clears up the low mental state which accompanies hypothyroidism.

Removal of the anterior lobe of the pituitary body from dogs by Cushing in 1909 proved that the loss of this glandular structure causes obesity[3]. This explained the obesity described for the disease called "dystrophia adiposogenitalis" by Fröhlich in 1901. The fat is distributed over the whole trunk and the attachments of the limbs. The genital organs are undeveloped and the subject, when the disease occurs early as is usually the case, fails to grow to normal height. Hence the name which means failure of growth, not only of the body as a whole but of the sex organs in particular. In more than 35 per cent of the cases of hypopituitarism studied by Boothby at the Mayo Clinic, the basal metabolism was from 15 to 20 per cent and more below normal (10).

Extracts of the anterior lobe cause resumption of growth with restoration of the sex organs to normal size and disappearance of excess fat. This was also shown experimentally in rats by Lee. The diminished growth rate characterized by deposition of less nitrogen and more fat in the hypophysectomized rat was completely restored to normal by the extract and the body regained its normal composition (11).

Loss of the sex glands by castration is obviously related to obesity because of the ease with which castrated farm animals put on fat as compared with the same animals not castrated.

Tumors of the adrenal gland cortex developing in childhood cause deposition of fat in much the same way as in the pituitary disease just discussed; but the sex glands, instead of being atrophic as in that disease, develop prematurely in these cases of adrenal cortical hypertrophy. A case reported by Fraser in 1940 and cited by Hoskins (11) was described as having an actual age of twelve months, but his dental age was three years, his bone age five, and his sexual age eighteen years. His weight was excessive, even for his skeletal age. A tumor the size of a golf ball was found above the right kidney.

Treatment of Obesity

To prevent trouble, if we are wise enough, is easier than to get out of trouble. So it is with obesity. Watching the body weight and counting calories is a sensible fad. This is especially important to those whose family tendency is to obesity, to those who have a diabetic heredity, and those who suffer from

[3] It is now generally admitted that it is an injury to the hypothalamus rather than loss of the hypophysis which causes the obesity after this operation.

heart disease. None of these classes should take the chance of overeating in proportion to their activity.

Cure of obesity is not so easy and requires will power. As Rynearson of the Mayo Clinic said in a panel discussion at the meeting of the American Medical Association in 1946, "There has never been a patient in the history of the world who would fail to lose weight satisfactorily if that patient followed a diet sufficiently low in calories, to permit weight reduction. . . . The safest and best treatment for obesity is a weight reduction program making certain that the patient has adequate mineral and vitamin supplements in which that diet is deficient" (12).

This, of course, does not apply to obesity from endocrine disturbances. The endocrine deficiency must be controlled first.

The danger of ketosis from incomplete combustion of fat in any regime for reduction should be borne in mind. This can be avoided by attention to the ratio of carbohydrate expressed as glucose to the fat of the diet expressed as fatty acid—the so-called F.A.:G ratio. Woodyatt and others have shown that no ketosis occurs when the molecular ratio F.A.:G is 1.5 or lower.

DIABETES

The famous Ebers papyrus, found in 1858 between the legs of a mummy in one of the graves of the Necropolis at Thebes, contains a passage which is believed to refer to diabetes. The passage is a prescription "to drive away the too much emptying of urine," as it is translated by Ebers himself and by Joachim, Ebers's successor as Professor of Egyptology at Leipzig (13). This papyrus dates from about 1552 B.C.

Artaeus, the Cappadocian, who lived in Rome in the second century A.D., gave the name "diabetes" to this "too much passing of urine," the name meaning "passage through." His description of the disease is unmistakable. It is certain, therefore, that it has been known to medicine by description and name for at least 1800 years (1).

Causes of Diabetes

The Hindus of the sixth century A.D. noted that the urine in diabetes is sweet to the taste, calling it "honey urine." They ascribed the disease to gluttonous overindulgence in rice, flour products, and sugar (1).

All modern authorities agree that dietary excesses predispose to diabetes. Some believe it is excess of carbohydrate primarily leading to obesity which is the principal error, while others, like Joslin and Allen, have held that overeating of protein also can break down the insulin mechanism. Allen, who introduced the so-called starvation treatment for diabetes some years before insulin was discovered, found, for example, that dogs artificially predisposed to diabetes by removal of a major portion of the pancreas became diabetic when they were overfed with meat (14).

Kisch in 1915 called attention to the frequency of diabetes in the later lives of fat children, and Joslin remarks that he never sees a fat child without thinking of that possibility, for a fat child like a fat man is prone to the disease.

Notwithstanding that diabetes was known to the ancients as a disease induced by excessive consumption of food, no attempt was made to treat it by dietary measures until Rollo, an Englishman, did so by restriction of the diet in 1796. Bouchardat some sixty years later was the first to advocate the use of fresh fats as a substitute for carbohydrate and the avoidance of milk because of the lactose it contains. By this time the progress of chemistry in France and Germany through Gay-Lussac and Liebig made possible a qualitative consideration of diets.

Progress from Bouchardat passes to Pavy (1829–1911) in England who introduced the analysis of blood for sugar, finding a definite relationship between the level of sugar in the blood of diabetics to the amount excreted by them. Claude Bernard in 1855 in France meantime had traced the sugar of the blood through the mesenteric veins to the liver where it was stored as what he named "glycogen" or animal starch. He noted, however, that a dog fed on meat had more sugar in the hepatic vein leaving the liver than in the portal vein going in. And thus it was discovered that sugar is formed from protein.

Here was one of the first steps in intermediary metabolism. Studies of the ratio of sugar to nitrogen in the urine of diabetics kept on a carbohydrate-free diet, promoted especially by Lusk, together with the determination of the ketonic acids in the urine, made possible the assessment of the severity of diabetes by the nineteen twenties.

By this time the stage was set for insulin which, you remember, was named before it was discovered. Banting's great contribution made possible the prolongation of life in all the thousands the world over who had developed diabetes.

But how about the dietary treatment in diabetes? Has it become unnecessary now that we have insulin? Having just a few days ago talked with C. B. F. Gibbs, our leading specialist in diabetes in Rochester, I am sure I am on safe ground in saying that the great majority of the members of the American Diabetic Association still employ dietary restriction with their cases. People are still dying of the disease and will continue so to die. The death rate for several countries has temporarily declined and is now holding steady at this reduced rate. But when those whose lives have been prolonged with the aid of insulin begin to die, the rate surely will rise again. Diabetics still develop degeneration of the blood vessels, leading to coronary occlusion in the heart, to lesions in the brain, and to gangrenous changes in the extremities. Something besides insulin is deficient in these patients.

Think what errors were made in the treatment of these disorders before the knowledge accumulated in each division of nutritional science became available. For example, the prescription of a diet for diabetes consisting of "milk, cereals, groats, and gruels," favored by Hippocrates and even by Arataeus, who named the disease (1); Liebig's mistake in assuming that because the muscles consist mainly of protein, the work which they do must be done at the expense of protein—a mistake corrected by his own pupil, Voit; and the misconception, not yet wholly eradicated, that all proteins have about the same value for the body.

Let us be profoundly grateful to the men and women of science whose labors made possible the rectification of these and the multitudinous other errors of the past. But we must not forget that new knowledge of the future will probably show up some errors of our own time. The only security against error is to be more and more sure of our facts and more and more thoughtful of our interpretations.

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What Is a Degenerative Disease?

The expression "degenerative diseases," refers particularly to the slowly progressive circulatory and metabolic disorders usually associated with aging. In contrast to the infectious diseases of youth, the etiology of degenerative diseases appears to be chiefly endogenous, cumulative and multiple; the onset, insidious and asymptomatic; the course, chronic, progressive, and nonimmunizing.

It is rational to distinguish between pathological aging and physiological aging. In *pathological aging*, the degenerations are accelerated by some external or internal environmental factor or factors which, if known, would be subject to control. On the other hand, in *physiological aging or senescence*, the degenerations are viewed as an involution or a retrogressive process which is as natural as growth. This view would teach that in the process of living, injurious chemical and physical conditions accumulate because of the imperfect adaptation of the body to its environment.

One of the first needs is to dispel the fatalism which surrounds the subject of degenerative disease. Within the last twenty years unequivocal progress has been made in the treatment of cancer, and there are reasons to believe that arterial disease may be brought under control.

For instance, let us illustrate what I mean by using arteriosclerosis as an example, since it is the major degenerative disease responsible for the failure of the function of such vital organs as the heart, kidneys, and brain. The following facts establish the view that something can be done about arteriosclerosis. Groddeck autopsied 283 persons over eighty. He found that 34 per cent had only slight sclerosis of the coronaries and 3 per cent had only minimal sclerosis of the aorta. (b) Arteriosclerosis does not appear with equal frequency in the sexes which is particularly true of coronary disease. (c) Coronary disease is more common in whites than in Negroes. (d) Arteriosclerosis is not uniformly distributed throughout the vascular system. (e) It occurs in association with renal disease and infections in children; hence, it is not solely correlated with age. (f) It can be produced experimentally in animals by many different procedures, and its development may be modified by various drugs and procedures. Numerous pathologists likewise believe that arteriosclerosis, such as affects the intima of arteries, is a disease and not the direct result of involution associated with aging. The incidence of the disease is very low in Iceland, which is attributed to the high iodine intake in food. Because of the relative complexity of the problem of the degenerative disease and the time factor involved, the solution to the problem will be more difficult and expensive than the problems presented by the infectious and acute diseases.—*Excerpted from an address by Dr. Andrew C. Ivy, Vice-President, University of Illinois, and Head, Department of Clinical Science, given at the Midyear Meeting of the American Pharmaceutical Manufacturers' Association in New York City, on December 16, 1947.*

Food and Its Emotional Significance[1]

CHARLOTTE G. BABCOCK, M.D.

PRIMARILY the consumption of food serves the biological need for energy and growth. Its nutritive function is essential for the maintenance of life. Eating, however, is an experience that may be invested with many intellectual and emotional values quite apart from metabolic utilization of the food. The vast amount of serious research that has been done in an attempt to understand man's food habits and to influence them in the direction of health attests to the importance of experience with food in the life history of every person. Sociological and anthropological data from both primitive (1, 2) and modern societies have shown that in any but the simplest society the acquisition of food is an extra-individual function. The performance of this function requires group activity involving inter-personal relationships and division of labor. A study of the food habits and subsistence economy of a culture provides many clues to the operation of major social and political processes and throws light upon its cultural configurations (3, 4).

There is much in common in all human behavior. The development of value attitudes within a culture depends upon many factors external to the individual, but also upon the manner in which the individual manipulates both his basic human needs and these external factors. For the therapist, whether nutritionist or physician, an understanding of how food can be used by individuals to accomplish purposes other than nutritive is essential to the modification of dietary behavior.

EMOTIONAL USES OF FOOD

To Relieve Anxiety

Food is often used as an instrument for the relief of anxiety. It is not uncommon for a mother to say, when she has silenced the baby's cry by giving it a bottle, that she feels more comfortable. Her identification with the child in his tension and discomfort stimulates her need to satisfy him when he cries and makes her anxious until he is again contented. Food not only relieves the infant's hunger pangs, but the process of feeding gives him pleasure. Correspondingly, adults, having experienced in the continuum of life the relief of tension by eating, revert often to this well-tested, satisfactory method of gratification.

A thirty-eight-year-old merchant suffered acutely on the instance of any quarrel. He experienced cardiac palpitation, flushing, a sense of internal quivering, and dull pain in his stomach on these occasions. Following an exchange of sharp words with his wife regarding a criticism made of him by his mother, he went to the icebox and consumed with no gustatory pleasure a 2-lb. pork roast. He commented, "As I devoured the meat, I felt stronger, and my anxiousness went away."

An understanding of this primitive method of handling anxiety helps one to appreciate the tenacity with which patients cling to old food habits, and why it is so difficult for them to follow a specific diet. If the food to which a person is accustomed is associated with a certain essential orderliness in his life, and a sense of well-being, because it is reminiscent of a less stressful period, he will, although only vaguely aware of these things, be keenly cognizant that anxiety and its unpleasantness are more readily felt in the absence of the food. Change from the routine makes necessary an alteration of one of his ways of handling his tension; his need for the continuance of the patterns of eating, in order to accommodate his psychological equilibrium may be greater than the possible rational and nutritive goal seen for him by the health educator or the physician.

To Deny One's Needs

Food may be used negatively to deny one's needs. It may be rejected because the taking of it, as contrasted with the removal of it mentioned above, produces anxiety. Here the anxiety rises because the individual is in conflict over the fulfillment of unconscious dependent needs which he feels he should not gratify. He may feel that he should deny himself pleasure.

A young woman of nineteen was admitted to the hospital in a debilitated state; she complained of fatigue, lassitude, and motor weakness. Thorough physical examination showed her to be suffering from severe malnutrition. One factor in her illness was her disinterest in and neglect of her nutritive needs. Questioning revealed that she had been raised by a strict, ungiving but ambitious mother

[1] Presented at the Dietetic Section of the meeting of the American Association for the Advancement of Science in Chicago, on December 30, 1947.

whose strength lay in her denial of any need for pleasure. The mother was a very "sensible" woman of Spartan-like discipline, whose gratifications were only those of intellectual achievement and monetary success. Out of her identification with this mother whom the patient tried to emulate, but who also stimulated competitive wishes, the girl tried to excel by being more of a Spartan, stronger, more independent than the mother. By self-deprivation she felt successful, and only then could she permit, through illness, any gratification of her dependent needs. Only by a slow process of reeducation could this young woman be persuaded to enjoy food, to take an interest in the accompanying household pleasures of skill in cooking, and to relax at a meal.

To Gain Acceptance and Security

Food may be used to increase one's feeling of acceptableness and security in society.

A patient reported with a note of bitter complaint the behavior of her husband. She had bought, in these times and at these prices, top grade round steak, had the butcher grind it carefully three times, and had presented her husband at his evening meal with hamburgers, broiled and beautifully garnished with thin carrot strips and sweet green peas, only to have him fly into a rage, condemn her for serving him "dog food," and stalk away from the table in high dudgeon, leaving her to humiliated isolation.

Here we see a number of factors at play. The husband is a very sensitive, intelligent professional man. He was the second son in a lower class family whose father was the "best but the most unprepossessing tailor in town." He hated his surroundings, felt ashamed of his quarreling parents and their standards of living, was unable to recognize that their disinterest in their children was not necessarily a function of their economic level, and resented their carelessness in matters of household hygiene. However false, his assumption, demonstrated by his behavior, was that hamburger is a low class meat, belonging only to dirty immigrants; it is associated with poverty, degradation, and disgust. He felt that in serving it to him, his wife had disregarded his prestige and pride. She had failed to recognize that in his terrific struggle to reach a higher professional level and to overcome intense feelings of personal inadequacy, he was not yet secure and could easily be reminded of earlier painful feelings.

The hamburger had become a symbol, a stereotype, that offended his prestige and his attitudes of self-evaluation. In this instance, the nutritive value of the meat was of no consequence; instead, it was invested with great psychological significance.

To Influence Others

A fourth important attitude toward food is seen in the awareness on the part of the individual that one's behavior with food can be used to affect the response and behavior of another person.

In the above example, the response of the wife is worthy of note. Surprised by the intensity of her husband's reaction, she felt rejected, humiliated, and unsuccessful in her efforts to please him. He roused her own feelings of anxious insecurity, since her own evaluation of herself was not altogether firm. Secondarily, she experienced anger and frustration. She felt the injustice of his attempt to punish her for arousing anxiety-producing feelings in him. She retaliated with wrath and rejection of him. For this couple, hamburger will be the permanent reminder of a state of tension.

Expanding this example a little further, one can call to mind innumerable experiences in which food is used to cajole, to discipline, to punish, to threaten, and to deprive children—to establish a non-verbal means of communication between people. Food substitutes are used frequently in this manner.

A man of sixty came in for a series of interviews; a successful and well-known business man, he felt some anxiety over relinquishing his position of importance and prestige to his only son, a competitive young man of no small ability. Throughout the first two interviews he kept in his mouth a beautiful pipe, well-polished and of excellent lines. Finally, the therapist commented that he had not lit it and asked what brand of tobacco he used; whereupon, the man confessed that he had "smoked" a pipe for twenty years, but had never used any tobacco, nor a single match. With a slow smile he explained that he felt much better with something in his mouth to bite on; then he could talk more freely with people, could make them feel at ease, could "chew" over his words, and have time to assess his clients. Here the use of a device to keep active early experiences with feelings in relation to oral function gave this man comfort in his wishes to control and influence people and gave him an added weapon to control his own responses.

ETIOLOGY OF EMOTIONAL REACTIONS TO FOOD

These four general points regarding attitudes toward food are by no means all-inclusive and are illustrative only of the emotional uses to which food may be put. They bring us, however, to some consideration of the etiology of these reactions. Studies from two sources confirm the clinical observation, the first of these being the study of the normal development of human behavior; the second being a study of the abnormal, particularly of feeding disturbances in young children and their eventual solution.

The biological need for nourishment makes itself known to the baby through sensations induced by hunger contractions. The child, unable to provide food for itself, can only inform its environment of its hunger and associated feelings of discomfort by the devices of communication which it now possesses, namely motor restlessness and crying. The re-

sponse of the mother to this need constitutes the first interpersonal experience of the child in which communication between two human beings is established. This communication is not on a verbal level but, for the baby, on that of crying and movement. The appeasement of hunger, through the ingestion of nourishment, is felt to be adequate. However, more than needs for nourishment are met by the process of eating. Observation of infants demonstrates that the sucking process itself offers the infant pleasure. Lying quietly awake, as well as in its sleep, the baby makes sucking movements. Shortly, he puts his small fist into his mouth and in other ways manifests the pleasure afforded him by activities associated with eating. Thus the urge for self-preservation through feeding becomes reinforced by the urge to gain instinctual pleasure in the process.

In his early feeding activity, then, the young child learns to cope with the discomfort of hunger. He learns to recognize that deprivation of a primary need over a period longer than compatible with his strength and development produces tension which may become intolerable for him, resulting in feelings of anxiety and fear. He discovers, too, that gratification of these needs not only satisfies his biological needs for nourishment, but also alleviates his anxiety and often has, in addition, the positive value of giving him pleasure. Further, he learns that frustration of his needs is frequently brought about by agents outside himself, and that in order to prevent this unpleasant state he must establish communication with these agents (5).

Response to Gratification or Deprivaiion

The baby's first experience with people is in relation to food. Treatment by the mother in administering food as to whether she makes food-getting easy, overwhelming, or frightening will determine his first impressions of the kind of world in which he lives. The child loves or hates, accepts or rejects the food. Shortly the mother, who provides the food, becomes the object toward whom these feelings can be expressed. In this first stage of growth, then, through the intimate connection between feeding pleasure, oral pleasure, and the roots of relationship with an object outside itself (6), the first patterns of love are set up and the foundation for development of later character traits are laid. Later, the child will experience anger at frustration and will try to bite to express this feeling; the reaction of the mother to the child's frustration will set up the pattern for his response to frustration, to conflict, and to deprivation for the rest of his life.

Effect of Emotional Strains on Infant Feeding

Observations were made by Escalona (7) on the eating behavior of fifty babies ranging from ten days to twenty-four months. These infants were in a nursery, cared for by many people and under circumstances (a women's reformatory) conducive to much tension on the part of those caring for the children. There were ten instances in this group in which infants less than a month old refused the breast consistently, although no physical cause for this could be found in either the mother or child, but in which the tension of the mother was severe. Over a twenty-month period of study, some pertinent statements could be made. The eating situation of the children was a very sensitive indicator of the emotional atmosphere prevailing in the institution at large. Disturbances in feeding behavior of these infants was much greater on parole days and holidays when the emotional tenor of their mothers or attendants was more labile, although the routine of feeding on these days was exactly the same as on any other day. When infants and young children are in close contact with adults, they perceive the emotional state of the adult and respond to it with consistent behavior, often consistently disturbed.

Lurie (8) confirmed again in 1941 that eating behavior can be understood only in relation to the child's whole pattern of adjustment. She studied twenty-five children in whom there was no organic disease and concluded that eating disturbances served, in general, three functions: first, the protection of the child's dependent status by compelling the mother to administer to his needs; second, revenge upon the mother for past and present deprivation; and third, self-denial to assuage guilt which arises from aggression toward the mother who has frustrated his demands for her entire affections.

Selling (9), in a number of papers, has pointed out repeatedly that difficulties in eating are functions of lack of security, either because the home itself is insecure or because the child is insecure with the parents. Mohr (10), Levy (11), Deutsch (12), and others have discussed the problems of parents which induce these difficulties. Often the overprotective attitude of the mother is compensatory to unconscious hostile attitudes of her own, a disavowal of the tendency to deny or neglect the offspring.

Personality Pattern of Obese Children

Much has been contributed to the clarification of these problems by the work of Bruch (13–16) and her associates on the physiologic and psychologic aspects of the food intake of children, particularly the problems referable to obesity. She describes graphically the unhappy state of these obese youngsters. Such children are immature for their age, overdependent, lacking in aggressiveness, and frequently appear in a family situation in which the mother is domineering often out of the poverty of affection for her in her own childhood. The father is weak and, perhaps out of his identification with the child against the aggressive mother, fails to guide the child con-

structively and is often overindulgent. The child, however, is not really passive, but very active in regard to food. He uses it as an outlet for aggressive and hostile feelings, a weapon to use in meeting progressively experienced failure and disappointment. The obesity is often the somatic compensation for the creative drives thwarted by the mother's need to control and manage the child in specific ways and to push him as she sees fit, even with food. The total size of the body thus becomes the expressive organ of conflict. It is as though the child must eat so as not to remain weak or small.

In my own experience with intensive therapy for adult obese patients, these patterns and others appear repeatedly. The use of food to manage anxiety and to obtain secondary and often nonsatiating gratification is very great. In ten cases seen in intensive therapy, six patients reported, after therapy was well established and the patient felt able to trust the therapist, that the activity of overeating was started on a surreptitious basis. It was a matter of "swiping" food from a mother who overfed her family, was constantly concerned about food, investing it with much value to her prestige as a good cook and provider, but who wanted to control when and what she fed the family. Five associated the increase in eating with the onset of menses with its concomitant anxieties.

It is interesting in this connection that Hellersberg (17) used food habits as a criterion for measurement of maturity in a study at a well-known eastern women's college. She found that good food habits were definitely related to the adolescent's general adjustment; and that maturity is not produced by any single type of family pattern (strict, lenient, or intermediary) but depends upon the parent's adaptability to the need of a changing younger generation and to a cultural pattern which as yet has no code but is in itself in transition.

Since this paper is not concerned primarily with diet therapy nor with psychotherapy, many studies of these problems have not been noted here. However, a most illuminating example of psychotherapy of a three-and-a-half-year-old child who was admitted to the hospital after six days of starvation, mutism, and loss of sphincter control, and who did not respond after five days of intravenous feeding is reported by Sylvester (18). The therapist recognized this child's severe regressive behavior as a symptom of neurosis and from the beginning treated the child with warmth, understanding, and patience, as though she were a very small and helpless baby. After the first interview, the child took her first meal in eleven days, permitting the nurse to spoon feed her. Consistent handling of this child with play therapy brought about a recovery. The author comments that emergency treatment of a severe feeding disturbance can be described as the adoption of attitudes and techniques in the management of the patient that foster a benign regression from which a new beginning can be made.

In conclusion, it may be said experiences with food affect the attitude and behavioral response of the child to early gratification and frustration. Selection of a method of resolution of the internal tension and anxiety concomitant with these experiences depends upon his earliest interpersonal relationships. His attitudes toward and use of food as an adult to provide security for himself and to communicate with, control, or manipulate other persons may be derived from these early experiences.

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Exhibit Planning and Analysis

BRUNO GEBHARD, M.D.

Director, Cleveland Health Museum

IT MIGHT be well first to set the scene by mentioning briefly the work "exhibits" are expected to do. To begin with, they are but one of many types of aids which further visual education; and in its broadest sense, visual education includes all learning in which seeing is involved.

It follows logically, then, that materials for learning-through-seeing are endless. Yet, although these possibilities are limitless, in actual practice learning-through-seeing is limited. For instance, mere seeing is not learning or observing. There's an old axiom which reads, "Seeing is believing." A corollary might read, "Seeing is believing what one is ready to believe."

Individuals are limited in their ability to gain through visual education by their individual powers of observation, their particular interest, and their mental training.

Another limitation placed on the extent to which visual education may be successfully carried is the selection of what is to be seen. No one will question that there is a "wealth of visual material lying about waiting to be utilized." The difficulty is that it is impossible to use all of it. It is necessary to select from the mass what will best serve a particular purpose.

It should be emphasized that visual education in the field of health presents a much greater problem than the gathering of material for factual teaching. Then, too, material for health education must also be selected keeping in mind that all types of people will be expected to benefit. Selection of material is necessarily of prime importance.

HOW TO JUDGE AN EXHIBIT

There is only one proper way to judge an exhibit: "Does it work?" that is, "Does it do what it's supposed to do?" and, a necessary *prima facie*, "What is it supposed to do?" Exhibits are intended to report facts, to inform the spectator, to instruct the ignorant person, to make him feel good or bad, to change a person's mind, to make the on-looker do something he had not intended to do before seeing the exhibit.

There are several ways to make a "good" exhibit. One is to have your material localized, aimed at a particular community or section, rather than dependent on national facts and figures. Another way is to limit your subject matter. Often exhibits have the words "Too much" written all over them—too much said, too much to learn, too much to read, too many figures to understand. Information should be particular, not general.

Another sign of a good exhibit is that it tells the facts straight, without equivocation. And finally, the best exhibit is always the one which demonstrates the way to save or benefit a life.

FOOD FACTS AND FALLACIES

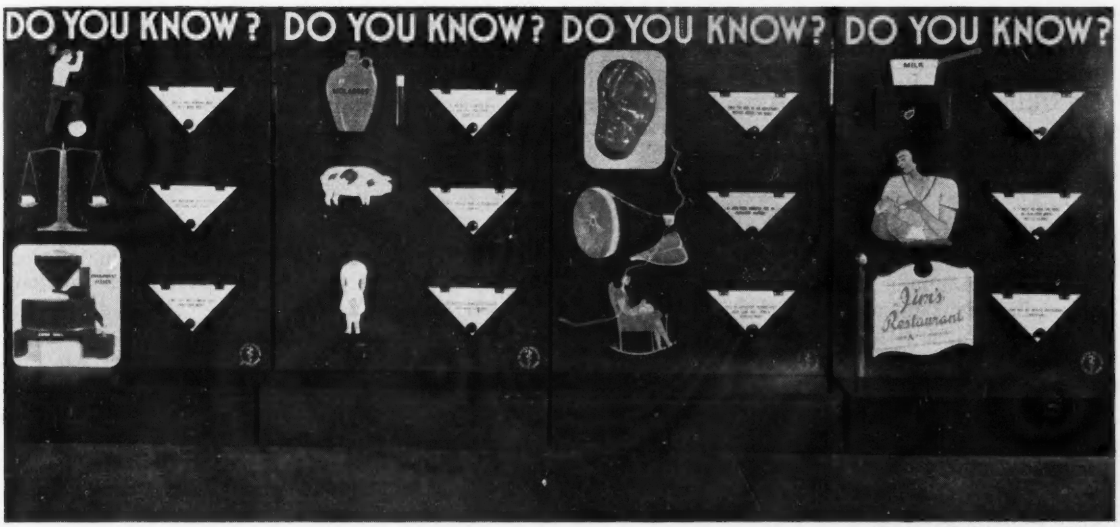
Up to a few years ago, pictorial methods in nutrition education had been widely used for the most part only by private concerns. They realized the effectiveness of understandable, colorful pictures in advertising. This technique of pictorialization and simplification of captions has been most successful in the Cleveland Health Museum's popular loan exhibit, "Food Facts and Fallacies."

In designing this 8-ft.-long exhibit, wood and plastic models of food connected with popular fallacies were constructed. On hinged flaps adjoining each model appear common questions, among them "Is fish a brain food?" and "Should acid fruits and milk be eaten at the same meal?" Visitors find the answers by pulling open the flaps.

Recently, the Health Museum workshops prepared a similar exhibit for the South Carolina State Board of Health, entitled "Do You Know?" Questions and answers and appropriate models were adapted for use in instructing expectant mothers. Sample questions and answers include:

Q. Are margarine and butter of equal value?
A. Yes, if margarine is fortified with vitamin A as required by law in South Carolina.
Q. Is lean pork harmful for an expectant mother?
A. No. It is an excellent source of protein and vitamins.
Q. Is raw milk a safe food for an infant?
A. No. Babies should have only pasteurized or boiled milk.

Both preliminary sketches and questions and answers were revised many times before final models and copy were prepared.



Cleveland Health Museum Photo.

"Do You Know" exhibit recently prepared for the South Carolina Board of Health in the workshops of the Cleveland Health Museum. Questions and answers and appropriate models were adapted for use in instructing expectant mothers.

Ideas for exhibits do not always come in "a moment of inspiration." More often than not, they require long careful thought and much re-working, correcting, and revising before "just the right thing" is produced. Beyond all semblance of a doubt, the hardest part of exhibit making is the initial planning. Yet, it is this careful beforehand thought and consideration which reaps the dividends.

TEACHING NUTRITION WITH PICTURES

It has been said that there are four different aspects to the problem of teaching people the "do's" and don'ts" of proper nutrition. First, there are persons who don't know enough; second, those who don't grow enough; third, who don't have enough; and last, but not least, who don't care enough.

In health education, we have to deal only with the first and last groups and, we might add the group of those who know too much—but have not the right facts. Modern superstition in food fallacies is enormous, and everybody seems to have his pet peeve against some foods which do not agree with him or her. On the other hand, we do not have to worry about motivation—everybody wants to enjoy his three meals a day. Eating is and should be fun. People are sensitive if somebody comes along and, as they think, spoils their meals. In nothing are we so deeply rooted as in our food habits.

It is not necessary to teach how many units of one of the vitamins one needs or how many grams of calcium or milligrams of iron. We must talk to the people in terms of foods, that is what they buy and eat. The general public is only interested in how to select and how to prepare foods which will satisfy its appetite, preserve its health, and stay within its financial means. Therefore, instead of saying, "An adult woman, moderately active, needs 60 gm. protein, 0.8 gm. calcium, 12 mg. iron, so many thousand units of vitamins of the different varieties," Cleveland Health Museum exhibits say, "Include in your daily meals so much milk, two or more servings of fruit (one a citrus or tomato), potatoes and at least one other vegetable, one egg, one serving of meat or fish, bread and butter, and as much additional food as needed." Such a diet would fulfill the requirement of what has been called a "balanced diet"—a term which does not mean very much. It has been suggested that we use a more pictorial term, "colorful diet." The general use of this term would stress the inclusion of yellow citrus fruit or red tomatoes, green leafy vegetables, and dark bread.

The right terms to be used in nutrition education must come first before one can even attempt to translate them into pictorial form or make them useful for the education of the general public. Today the thinking of most people centers around calories and vitamins. Knowledge of the first has become quite general since World War I, but typical of how misunderstood is this term is the following written inquiry, similar to many hundreds received at the Cleveland Health Museum: "How many calories are there in a pound?" This question demonstrates the confusion in many people's minds. Commercial advertisements have added to that confusion. They have also created a craze for vitamins, giving too many people the impression that these are the only really important food elements.

PEOPLE LIKE SURPRISES

When planning an exhibit, it is also well to keep in mind that the visitor likes surprises and that grown-ups, as well as children, learn more easily

when they can have some fun. The visitor also likes to participate. We all have a natural desire to touch things. If we can pull levers, whirl knobs, push buttons, ring bells, and so on, we sense that we are personally and individually taking an active part in the display.

It is equally important to remember that no one can "take" statistics in a vacuum. Statistics may be made interesting if they are broken down into small units on the "ten finger basis." Occasionally, however, large numbers have a special dramatic impact; but "four out of five have it" has probably sold more toothpaste than could possibly have been disposed of by computing the total number of victims of pyorrhea.

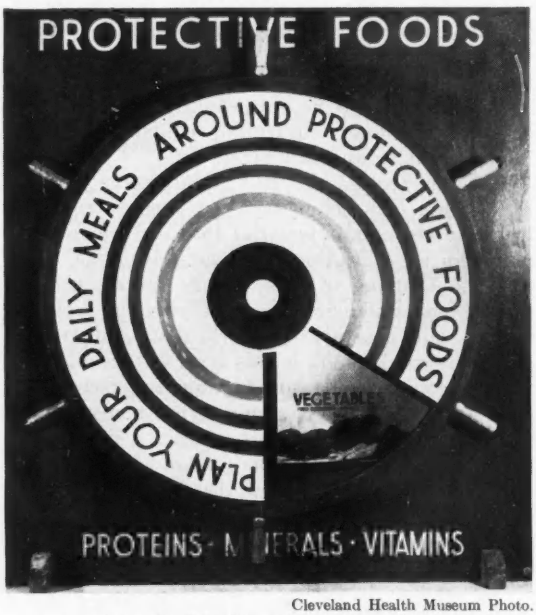
If you add statistics from your own community to statistics on a nation-wide level, you will bring the picture home. "Every day four people in our town . . ." is a "sure-fire" beginning. Almost always, statistics need a standard, a basis for comparison. The average exposition-goer, confronted with the local birth rate, death rate, or pneumonia toll, has no way of knowing whether you are pointing with pride or viewing with alarm. Tie the figures in with something he knows is "good" or "bad" and you control his reactions.

NUTRITION ROOM PROVES POPULAR

Within the "Nutrition Room" of the Cleveland Health Museum, the main exhibits are "How Many Calories" and "Protective Foods." The first is constructed as a calorie automat, and the visitor must turn a knob in order to find out how many calories there are in average servings of favorite foods, such as two biscuits (100 calories), 1 tablespoon of butter (100 calories), or a piece of apple pie (330 calories). Closely connected with the "Calorie Automat" is an exhibit called "Protective Foods." This exhibit gives in concentrated form the main points of the present recommended food groups for good nutrition. Under the title, "Eat Every Day," six different sections within a circle are covered by a steering wheel. This wheel must be turned by hand, showing at one time only one of the six sections in which wax models demonstrate the suggested foods.

"A Nickel's Worth" and "Your Lunch Box" are two other Health Museum exhibits which aid in teaching nutrition. The first compares the nutritional value of a pint of milk and a soft drink, milk giving twice the amount of calories, calcium, iron, protein, and vitamins. The four last items are shown to be absent in soft drinks. The second, "Your Lunch Box" shows wax models of adequate lunches for heavy workers and white collar workers.

The special tie-up between marketing and food value is shown in an exhibit called "Double Your Food Value for Less Money." This shows two filled market baskets. A sliding device permits only one basket to be seen at a time. In full view above the baskets all the time is a colored chart which shows the amount of protective foods in

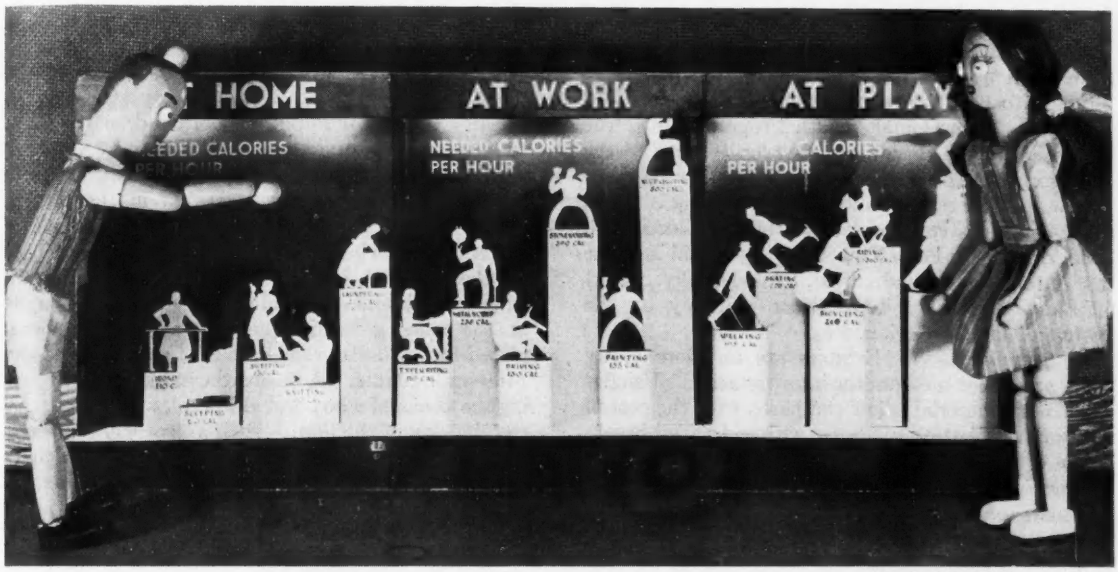


Cleveland Health Museum Photo.

An exhibit in the Nutrition Room of the Cleveland Health Museum. Behind the wheel are six sections, each representing one group of protective foods. In each section are wax models of foods representative of the group in question. By turning the wheel, one section at a time appears.

Cleveland Health Museum Photo

A staff member of the Cleveland Health Museum demonstrates the use of the "Calorie Automat," found in the Museum's Nutrition Room. By turning the handle next to the food in consideration, the number of calories to a serving can be determined.



Cleveland Health Museum Photo.

An exact replica in miniature of a regular exhibit in the Nutrition Room. Peter and Polly, the 7-in. dolls shown here, will be featured in a film-strip being prepared for use by the Cleveland Health Museum in teaching nutrition to public school children.

terms of the percentage of daily requirement received by wise, or not-so-wise, buying. Better than any words, this exhibit shows that good nutrition costs no more than what most people are accustomed to spending for food.

There are several other exhibits in the Museum's "Nutrition Room." Two are of general interest. One shows the needed calories per hour for work and play and for the many activities of a housewife. The second is especially designed for classroom use. An empty blackboard is used as a background, and blocks of six different colors—the colors denoting water, minerals, vitamins, proteins, fat, and carbohydrates—give the composition of whatever food is to be demonstrated. For example, milk is the most complete food showing all six; sugar is the most incomplete showing only water and carbohydrates.

The role of nutrition in preventing disease and in building the resistance of the body against infections has been recognized by the medical profession. The bacteriological era in public health which has brought us such enormous progress in the control of communicable diseases is going to be succeeded by a nutritional era which will help in the promotion of family health of all the people.

MINIMUM REQUIREMENTS FOR SUCCESSFUL EXHIBITS

Unfortunately, there is no six-word advice for exhibit makers, such as George Bernard Shaw offered for speakers: "stand up, open up, shut up." There are, however, five minimum requirements for any successful exhibit.

Time is an important factor in all exhibit planning. Allow yourself a full month for even the simplest exhibit. Really simple ones sometimes take a good deal longer. But it is encouraging to note that exhibits influence the community in direct proportion to the efforts which have been put into them.

Prepare a complete manuscript. Put down in writing the purpose of your exhibit. Describe the basic idea. Be specific about facts and figures to be used and the technique by which they will be shown. Your manuscript should also include complete copy and a detailed budget of your probable expenses.

Prepare a preliminary sketch. Plan the layout, showing how the floor and wall space will be used. Consider all three dimensions, especially the height of partitions or panels. Indicate whether artwork or photographs will be necessary; whether you will show real objects or models; what electrical installations, if any, you will need; what color scheme you will use; what type of lettering is most suitable for your captions. Cardboard models may be made using a scale of 1 in. for 1 ft. This will aid you to sell the idea of an exhibit to your agency's budget committee, and it will surely simplify your report on the progress of your plans.

Prepare all-inclusive copy. Exhibits have been called "illustrated headlines." What is your headline or caption? How much of an explanation do your pictures or models need? How many words should you use? Can initials take the place of words? Can you use shorter words? If you use charts or pictorial diagrams, be sure to include the key. If credit lines have been requested, don't forget to provide them.

The caption should clearly state your point. To save the largest possible letters and the most prominent possible position for your organization is no way to lure the passer-by in a non-professional audience. "The Child Health Program Under the Provision of the Social Security Act" is one of the best examples of how *not* to write a caption. By shortening the caption and perhaps putting it in the form of a question, i.e., "How Many Children Will Be Crippled by Polio This Year?" you will increase its interest a hundredfold. Incidentally, short captions keep costs down, since you pay by the letter for hand lettering.

Prepare a budget. Exhibits are no more costly than any other medium for interpretation. Usually the cost of material is low compared with the cost of artwork and lettering. Start with a detailed breakdown of your estimated expenses and allow at least 10 per cent for unexpected contingencies. The expenses of an exhibit can be grouped in three categories: preparation, construction, and operation.

Under preparation costs, you should include the research worker, the exhibit consultant, and the exhibit designer. For modest displays these three functions may be performed by one person, but no one of them may be neglected in the preparation of any exhibit. Attempts to save on preparation costs through using the services of regular staff members or unskilled volunteers may result in expensive mistakes and delays. The inexperienced or incompetent volunteer often uses valuable staff time and sometimes causes an embarrassing problem if her work is unacceptable.

Construction costs include basic materials (i.e. wood, beaver board, crepe paper, and so on), photographs, artwork, lettering, lighting, and electrical or mechanical devices.

Operation costs cover shipping, installation, an attendant, (if one is hired), and sometimes rent for the space of the booth and furnishings.

AN EXAMPLE AND A CHALLENGE

Experience has proved time and time again that the initial cost of an exhibit is repaid many times. Multiple profits are certain to accrue. For one thing, a *good* exhibit is an excellent vehicle for advantageous publicity. This not only creates new and added interest within the sponsoring organization but also serves to bring about a desire for even greater activity if the exhibit is received favorably.

An example of this is found in a project of the Health Museum Schools' Advisory Committee. Greater Cleveland Public School children will soon be aided in their study of basic nutrition by a project of this committee. A strip-film, featuring two wooden, gnome-like figures created in the Health Museum Workshops, is now in the final stages of preparation. These two figures will be photographed against backgrounds of miniature Health Museum exhibits. In addition to instructing pupils in the rules governing healthy eating, the completed film will also represent in effect a tour of the Museum building. A recorded commentary, featuring the voices of a boy and girl pupil, will accompany the showing of the film. Their voices will represent for the school audiences the voices of the film characters, known as Peter and Polly Peppy. An actual tour of the Health Museum by pupils and teachers will complete the study unit.

Already local newspapers have carried stories and pictures on the project. House organs and journals are following suit, and yet the project is only "nearing" completion. When the film is actually shown in schools and health education centers, pupils will tell parents, parents will tell friends, friends will . . ., and so on. Not only will valuable health information be disseminated, but more and more persons will come to know of the Health Museum and the work it endeavors to accomplish.

Plans are also underway for additional film-strips to be made under the same general plan as the present one on nutrition. Proposed topics include, "Good Health Habits," "The Five Senses," and other subjects pertaining to healthy living.

The miniature exhibits used in preparing the films will also be available for loan.

We have today a great wealth of material on "Nutrition in Pregnancy" and, yet, still more research data are needed. But even more, we need new ways and means of interpreting this information for prospective mothers. Questions such as, "*What* available material should be put into lantern slides, exhibits, etc.?" and "*How* should this be done?" still need answering. If we had the answers, they would serve as great aids in teaching.

Perhaps, what is needed most at the present time is a manuscript on the topic, "Nutrition in Pregnancy." Are you one who could help?

Trees as a Possible Source of Cooking Oils

A new chemical process has been developed for separating "tall oil" into its component parts—vegetable fats and rosins—in purer form that has been possible heretofore. "Tall oil" is derived from the liquor remaining after wood is cooked in making pulp for paper. Although it is not yet known whether production of vegetable oils for cooking and frying will be economically efficient with this process, it is virtually certain that the fields of application of both vegetable oils and rosins will be enlarged when the process is put into commercial use early in 1949.—*Food Field Reporter, February 16, 1948.*

Effect on Bacterial Growth of Various Methods of Cooling Cooked Foods[1]

LOIS CAROLYN BLACK and MARTHA NELSON LEWIS

The Ohio State University, Columbus

REFRIGERATION of raw and cooked foods has long been recognized as one of the most important factors in food sanitation and in the prevention of food-borne disease caused by bacterial growth. It is well known, too, that bacterial multiplication and chances for food poisoning are increased when food, particularly cooked food, is allowed to remain for any length of time at room temperature or at a temperature favorable to bacterial growth. Jensen (1) states that the growth zone for bacteria which cause food poisoning, particularly Staphylococci, is from 50°F. to 120°F. Most rapid growth occurs in the temperature ranges of 70°F. to 115°F.

Several authorities have recommended prompt refrigeration of cooked foods in order to eliminate the hazard of foods remaining in the dangerous incubation zone for any length of time. However, the effectiveness and desirability of refrigeration of foods immediately after cooking has been questioned. Many cooks object to it, for the common practice long has been to allow hot foods to cool to room temperature before refrigeration. It is a popular conception that prompt refrigeration of hot foods will produce "souring," or will cause a "sealing-in" of heat in the interior of the foods by congealing the outer layers. In the days of iceboxes this view was substantiated by the fact that the introduction of hot foods into the icebox caused the ice to melt and raised the temperature of the box to a point favorable for bacterial browth and food spoilage. Horwood (2) states that in these days of mechanical refrigeration, however, it is a fallacy to believe that prompt refrigeration of hot foods will produce souring and that the common practice of allowing foods to cool first to room temperature before refrigeration is dangerous and leads to food poisoning. Benham (3) had advised immediate refrigeration of all cooked foods, especially meats.

The literature reveals no reports of studies to determine the effects of prompt refrigeration on the rate of cooling of hot foods. This study was conducted, therefore, to observe the cooling rates of various foods cooked in relatively large quantities and refrigerated in the following ways: immediately after cooking, after an interval at room temperature, and after cooling to room temperature.

METHOD OF STUDY

According to the United States Public Health Service (4) report of 1945, the foods causing the greatest number of food poisoning outbreaks were in decreasing order: cream fillings in pastry, cake, and pies; poultry; hams; prepared luncheon meats; ground meats; sliced meats; potato salad; and chicken broth. Food poisoning in most instances resulted from mishandling of the food with subsequent growth of bacteria caused perhaps by inadequate refrigeration. Soft custard, baked ham, stewed chicken, and chicken broth, therefore, were chosen as foods to be studied, since all are common offenders, are important in food service, and are often subjected to inadequate refrigeration.

The studies were conducted in the main kitchen of The Ohio State University Hospital, where food is prepared for approximately 275 patients and 350 cafeteria patrons. The foods to be studied were prepared by the same individuals throughout the experiments and under the supervision of the writer. After cooking, the food was divided into equal portions, placed in similar containers, and cooled either by immediate refrigeration or by refrigeration after cooling at room temperature for various intervals of time.

An electric walk-in refrigerator, 92 in. high, 96 in. long, and 58 in. wide, cooled by overhead finned coils, was used. Refrigerator temperatures varied from 36°F. to 40°F. There was no forced air circulation nor control of humidity. A Taylor Fahren-

[1] The data presented here are from the thesis of Lois Carolyn Black, written as partial fulfillment of the requirement of Master of Science degree, The Ohio State University, December, 1947. Received for publication February 20, 1948.

heit thermometer was placed on the inside wall of the refrigerator, 5 ft. from the floor. Temperatures were observed at that point, and hot foods undergoing refrigeration were placed within a 3-ft. radius of the wall thermometer. During the refrigeration of hot foods, the temperatures of previously refrigerated foods located 6 in. and 12 in. from the hot foods were noted. Thermometer readings were taken of the temperatures of these previously refrigerated foods 1 in. below their surfaces with a glass Centigrade thermometer.

An attempt was made to study these foods under circumstances which normally would be present during preparation in this hospital. Certain variables, therefore, were not controlled. Refrigerator cooling rates were observed in a walk-in box which of necessity was used throughout the studies for the refrigeration of foods other than those being studied. The refrigerator load and the number of times of opening and closing the door were not controlled; hence, refrigerator cooling proceeded under conditions which ordinarily would be present in everyday food preparation.

Since the food being studied was eventually used in food service, certain limitations were placed on the study. In several instances, when it would have been desirable to observe larger quantities of food, such quantities were not available. In most cases, however, the amounts were representative of amounts used in a food service unit of this type and size.

Hams

As far as possible, hams were chosen of similar size and weight. These were boned and tied by the cook, then weighed and baked in a 350°F. oven until the internal temperature of the hams reached 180°F. The internal temperature was measured with a Taylor meat thermometer encased in stainless steel and inserted into the center of the thickest part of the meat. After removal from the oven, one ham was refrigerated immediately. A second ham was allowed to cool at room temperature, uncovered, for a period of time before refrigeration. This time varied since in most cases an internal temperature, usually 115°F., was taken as the point for refrigeration. A third ham was allowed to cool at room temperature, uncovered, until its internal temperature reached or neared room temperature, whereupon it was refrigerated. Hams were cooled in pans of similar size and construction. Temperatures were noted at various times after the 180°F. temperature was reached: 15 min., 30 min., 1 hr., and thereafter hourly until the hams had reached approximately refrigerator temperature.

Chickens

Chickens to be studied were chosen of the same approximate weight and conformation. These were cleaned by the cook, left whole, and boiled in a stock kettle for about 3 hr., until tender. The number of chickens prepared at one time varied from eighteen to twenty-four.

After cooking, the chickens were removed from the stock and a thermometer was inserted in the center of the right inside thigh muscle. The rate of heat loss was noted after 15-min. intervals for 2 hr., then hourly until the chickens approached refrigerator temperature. The chickens were cooled in pans of similar size, large enough to hold three chickens laid side by side. A similar layer of three chickens was placed on top. The chicken to be studied was placed in the center of the bottom layer. Stacking of chickens in larger pans was not considered advisable, and since the quantity of chickens ordinarily cooked at one time in this food service rarely exceeds the quantities cooked in these studies, greater stacking of chickens to conserve space was not necessary. The chickens in groups of six were refrigerated in a manner similar to the method described in the cooling of ham. The temperature changes of one chicken in each of the three groups were observed.

Chicken Broths and Soft Custards

Chicken broth was drawn off from the stock kettle and measured into containers of equal capacity and construction. One was refrigerated immediately; one was cooled, uncovered, at room temperature and then refrigerated. The temperature at the approximate center of the broth was recorded after 15 min., 30 min., 1 hr., and hourly thereafter until refrigerator temperature was neared. Room and refrigerator temperatures, and the temperature of previously refrigerated foods were noted as in the previously described studies. The period of cooling at room temperature was variable. The quantity of broth ordinarily prepared did not allow a study of the three methods of cooling at one time. Since broth usually is cooled in large quantities, it was thought advisable to limit the number of containers, thereby cooling it in as large amounts as were available.

Soft custards, prepared by the pastry cook, were studied in a manner similar to that used in the study of broths.

Bacteriological Studies

Bacterial counts were taken of several of the foods in order to note any influence of the methods of cooling upon the growth of bacteria. Samples of the foods were taken prior to cooking, immediately after cooking, and after cooling approximately to refrigerator temperature. Chickens which had been cooked, refrigerated, and then removed from the bones by workers also were sampled. A fine suspension of the sample was formed by shaking with sterile glass beads. Dilutions of the samples were plated on tryptone glucose agar, and the plates were incubated at 37°C. for 48 hr. No attempt was

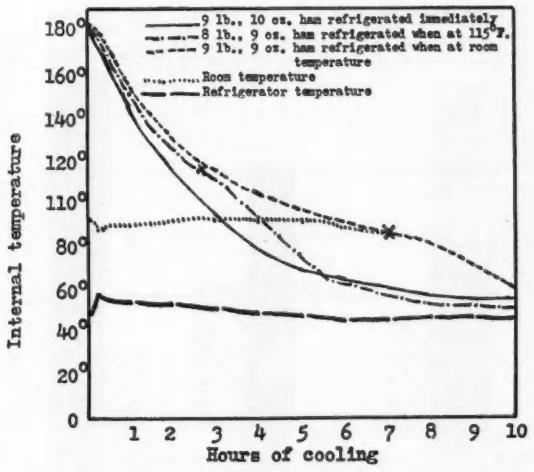


FIG. 1. *Cooling curves of three hams.*

made to determine the type of colonies present, since the total count was to serve merely as an indication of bacterial growth.

RESULTS

Cooling periods were divided into three temperature ranges: Period I, from 180°F. (the final cooking temperature) to 150°F.; Period II, from 150°F. to 115°F. (the growth range for thermophiles); and Period III, from 115°F. to 70°F. (the dangerous growth zone for Staphylococci). Figure 1 illustrates a typical cooling curve. Similar curves were plotted for each experiment. The cooling rates of the ten hams observed are presented in Figure 2 and of the chickens in Figure 3.

The rates of interior cooling of chicken broth varied considerably in these studies, for the cooling rate was influenced by the quantity of the broth and the size and shape of the cooling vessel, factors which were unavoidably variable. Figures 4 and 5 are graphic presentations of the observations made during the cooling of broths.

The rate of cooling of custards, like chicken broth, was dependent upon the quantity of custard and the size and shape of the cooling container. Hence, the rates of cooling in these studies were variable. The data are illustrated graphically in Figures 6 and 7.

The results of bacterial counts upon the foods studied are shown in Table 1. In general, cooking destroyed most organisms; however, bacterial growth was found in chickens in Experiment 7 and in soft custard in Experiment 12 from samples taken directly after cooking. On the whole, greater bacterial growth occurred in foods cooled at room temperature than in food refrigerated immediately.

DISCUSSION

There was no evidence obtained in this study to substantiate the statement that prompt refrigeration of cooked food will cause a "sealing in" of the internal heat. On the contrary, the interior of foods refrigerated while still hot cooled at a faster rate than the interior of foods cooled to room temperature and then refrigerated. The time in which foods remained in the danger zones for bacterial growth—in particular the temperature range of 115°F. to 70°F.—was lessened by refrigeration of the food before its internal temperature reached 115°F. Cooling of foods to room temperature before refrigeration increased the time at which internal temperatures remained in the zone for bacterial growth. The chances for bacterial spoilage of foods are diminished, therefore, by prompt refrigeration of the foods after cooking. This fact substantiates Horwood's (2) statement that it is a fallacy for cooks to believe that foods will spoil if refrigerated while hot.

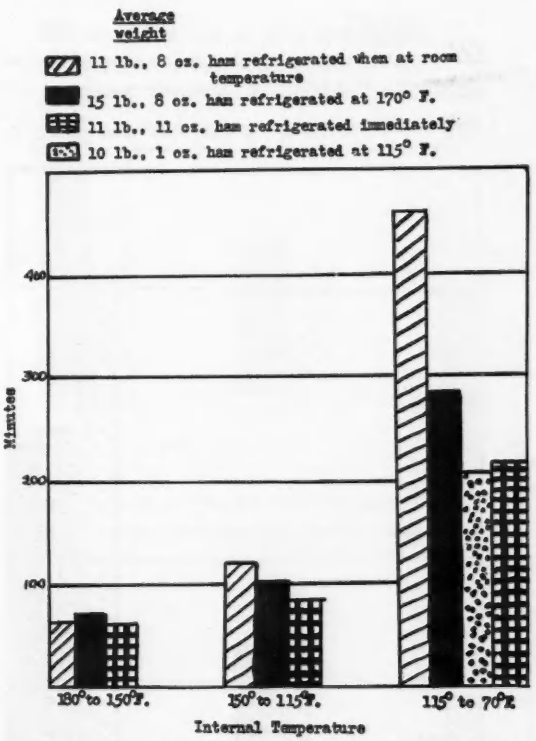

Average weight
11 lb., 8 oz. ham refrigerated when at room temperature
15 lb., 8 oz. ham refrigerated at 170° F.
11 lb., 11 oz. ham refrigerated immediately
10 lb., 1 oz. ham refrigerated at 115° F.
Minutes
400
300
200
100
180° to 150° F.
150° to 115° F.
115° to 70° F.
Internal Temperature

FIG. 2. *Average minutes required to cool hams through the temperature ranges of 180°F. to 150°F., 150° to 115°F., and 115° to 70°F. by various methods of cooling.*

It is interesting to note that both refrigerator-cooled and room-cooled foods lost heat at about the same rate for approximately the first half hour. For cooling from 180°F. to 150°F., immediate refrigeration did not in most cases cause an appreciable increase in the rate of heat loss from the interior. No observations were made on the rate of heat loss from the surfaces of the foods studied.

Since the refrigerator temperature was approxi-

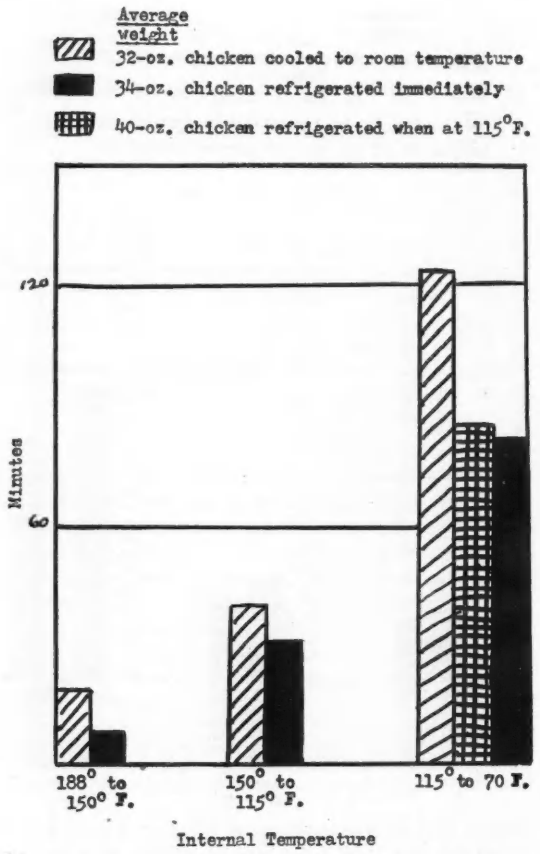


FIG. 3. *Average minutes required to cool chickens through the temperature ranges of 188° to 150°F., 150° to 115°F., and 115° to 70°F. by various methods of cooling.*

mately 40°F. to 50°F. less than the room temperature throughout the studies, a faster rate of cooling might have been expected in the refrigerator during the entire cooling process; however, the rate of heat loss from a cooling body is only partially influenced by the temperature of the cooling medium. Since measurements were made of internal temperatures of the foods, conduction was an important factor in determining the rate of heat loss.

Cooling curves produced in these studies are not necessarily characteristic of all hams, chickens, broths, or custards, even of the same size and quantity. The rate of internal heat loss from hams and chickens is influenced by shape, size, amount of bone and connective tissue, specific gravity, and the amount and distribution of fat and water. The temperature of the cooling medium is, therefore, only one factor in determining heat loss from the interior to the surface of the food. Since these factors are variable with each individual food studied, cooling curves of foods should be studied individually, for two similar foods, although of equal weight or quantity, would not be expected to cool at the same rate, even under the same cooling conditions. Although in this study averages were computed for the meats cooled in the same way, this was not done in an attempt to establish an actual average rate of heat loss to be expected from such food, but rather to compare the rates of heat loss of foods cooled in the various ways.

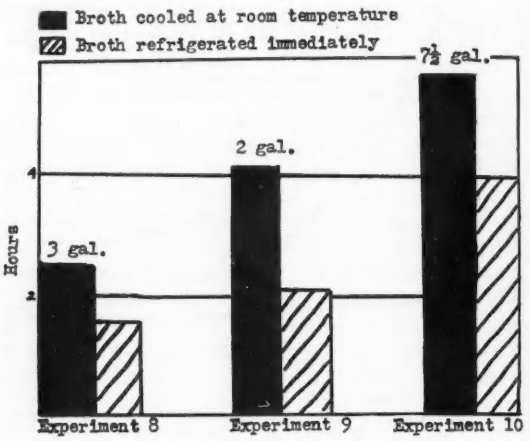


FIG. 4. *Hours required to cool various quantities of broth from cooking temperature to 115°F.*

Rates of cooling of broths and custards were variable. Although specific gravity is involved to some extent, these foods are more likely to be fairly consistent in character than certain other foods, such as meats. Rate of heat loss was influenced by the quantity of the broth or custard and by the size, shape, and construction of the cooling vessel. The shorter the distance from the center of the liquid to the cooling surface, the faster was the cooling. Occasional stirring probably would increase the rate of heat loss.

Tanner (5), Hussemann (6), and others have pointed out that there is a possibility that cooking may not destroy all bacteria in all foods. Samples from cooked chicken and from soft custard showed some bacterial growth. Since these samples were taken from the interior of the food immediately after cooking, there was little chance of surface contamination of the food. Presence of bacteria, therefore, was due either to contamination during the sampling or plating process or to the survival of the organisms through cooking. Although the number of bacteriological studies made was not adequate to draw reliable conclusions, growth of bacteria in these cooked samples gave some evidence that the foods may not have been entirely sterilized. The sample of soft custard which was cooked only to 167°F. showed considerable growth which increased during cooling. Although the colonies were not identified bacteriologically, their appearance was characteristic of staphylococcal colonies. On the whole, most

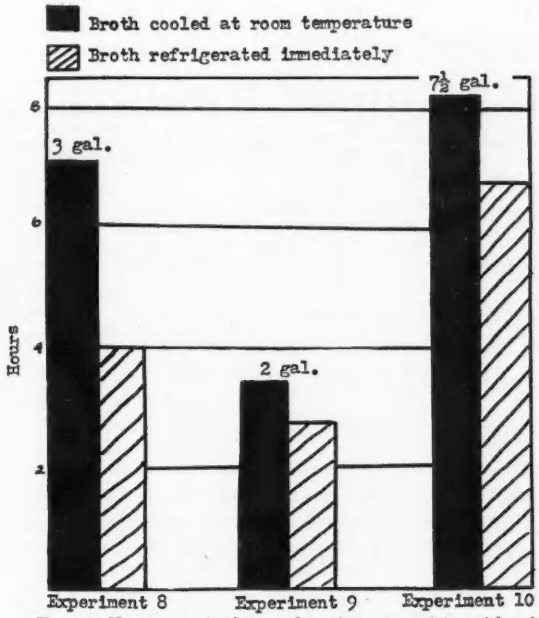


FIG. 5. *Hours required to cool various quantities of broth from 115° to 70°F.*

samples, particularly cooked samples, did not support much bacterial growth, and the slight growth which was produced probably was due to external contamination after cooking.

Since surface temperatures were not taken, no conclusions can be made concerning the effect of immediate refrigeration on surface temperature. Presumably refrigeration would lower the surface temperature more rapidly than cooling at room temperature, hence inhibiting the growth of bacteria which may have contaminated the food surface after processing. Immediate refrigeration or covering of food can help to prevent such contamination from food handlers, flies, dust, and the air.

Since immediate refrigeration, in most cases, did not hasten appreciably internal cooling from 180°F. to 150°F., these studies seem to substantiate Benham's (3) recommendations that hot foods be cooled at room temperature until through steaming, then refrigerated. Since surface contamination of the food kept at room temperature is always a potential danger, studies of the effects of immediate refrigeration and of room cooling on surface temperatures and surface contamination should be determined before definite refrigeration recommendations can be made.

Although the refrigerator must be operated at greater expense in order to refrigerate hot foods immediately, in many establishments, among them The Ohio State University Hospital, where the kitchen is crowded and limited in its cooking and room storage area, immediate refrigeration of hot foods is practical. The walk-in refrigerator provides

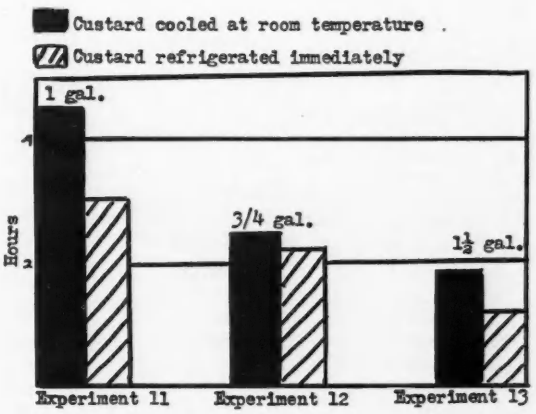


FIG. 6. *Hours required to cool various quantities of soft custard from 170° to 115°F.*

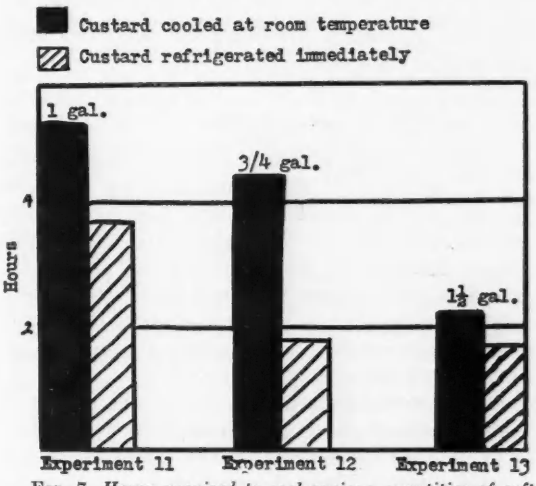


FIG. 7. *Hours required to cool various quantities of soft custard from 115° to 70°F.*

an immediate and convenient storage area where foods can be kept out of the way until needed with the least chance of contamination.

The practice of serving foods, such as soft custards, into small containers while still hot, then refrigerating, is a good one provided there is sufficient refrigeration space. Refrigerator cooling proceeds at much greater speed in small quantities.

Rapid cooling of freshly cooked hot foods is only one way to insure food sanitation. The greatest danger of food poisoning produced by chickens, for instance, is from careless treatment of chicken which has been cooked and removed from the bones. Samples of such chicken showed considerable bacterial growth (Table 1). This process necessarily involves contamination by the food handlers, for Staphylococci are present on the skin and beneath the fingernails of most people (5). The advantages provided by the rapid cooling of hot foods would be of no value unless all of the provisos

TABLE 1

Bacterial counts of food samples plated on tryptone glucose agar

EXPERIMENT	BACTERIAL COUNTS					
	Raw sample	Cooked sample	Sample refrigerated immediately	Sample refrigerated when at room temperature	Sample refrigerated when at 115° F.	Sample of chicken cooked, refrigerated, then removed from bones
Ham						
Experiment 2	0	0	0	500/gm.	110/gm.	
Experiment 3	250/gm.	0	0	0	0	
Experiment 4	750/gm.	0	0	675/gm.		
Chicken						
Experiment 6	3600/gm.	0	150/gm.	70/gm.	400/gm.	700/gm.
Experiment 7	1050/gm.	300/gm.	0	0	125/gm.	13,000/gm.
Chicken broth						
Experiment 8		0	0	0		
Soft custard						
Experiment 12		200/cc.	300/cc.	10,000/cc.		

for good sanitation are observed until the food reaches the consumer.

CONCLUSIONS

Internal cooling of hams, chickens, broths, and soft custards cooked in large quantity was hastened by refrigeration immediately after cooking. These results indicated that foods should be refrigerated either immediately after cooking or should be cooled at room temperature for ¼ to ½ hr. and then refrigerated, as the rate of heat loss during this initial short cooling period was essentially the same in or out of the refrigerator.

Studies are in progress to observe the effects of various methods of cooling on the rate of heat loss from the food surface and on the extent of surface contamination. These observations should be completed before definite recommendations for the optimum time for refrigeration can be made.

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Food for the Eskimo

The primitive Eskimos are very fond of their children. They believe their children should have the best food, and their idea of the best food is the head, usually, and the next best in the case of fish is the tail. So the heads and tails were saved, to be boiled and fed to the children for lunch.

The frozen fish were, most of them, a little bit longer than a big ear of corn, and we ate them the way you eat corn from the cob; that is, first we'd peel off the skin, something the way you peel a banana. Then we would gnaw the fish, somewhat as you gnaw corn from a cob. When you come down to the cob, you put it aside. Similarly, when we came close to the entrails, we put them aside. The entrails were still in the fish, but we never touched them in eating; they were the dog feed. I emphasize this, because I have been misquoted in medical books—and this misquotation keeps being passed on from book to book—to the effect that I was able to be healthy because the Eskimos and I ate the entire fish, including the organs. We did not. We ate only the flesh from the outside; the dogs got all the entrails and internal organs.—*Excerpted from an address given by Dr. Wilhjalmur Stefansson at the Public Conference on Nutrition sponsored by the Chicago Medical Society, October 1, 1947.*

Nutritional Status of Children

V. Blood Serum Protein[1]

ELIOT F. BEACH, ANN P. HARRISON, MARJORIE LESHER, MILDRED KAUCHER, CHARLOTTE RODERUCK, WANDA LAMECK, and ELSIE Z. MOYER

Research Laboratory, Children's Fund of Michigan, Detroit

BLOOD serum protein concentration for many years has been thought to be related to dietary intake. Subsequent to observation of nutritional edema in World War I, Kohman (1) demonstrated that the condition could be produced in rats by feeding a protein-deficient diet consisting of raw carrots, cornstarch, salt, and fat. Peters, Wakeman, and Eisenman (2) concluded that total serum protein values of less than 6.0 gm. per 100 cc. usually are found in cases of protein starvation. Even in this early work Peters and co-workers pointed out that the total blood volume may undergo a compensatory reduction thus masking the loss of protein by leaving the unit concentration unaltered. Bruckman, D'Esopo, and Peters (3) demonstrated, using a limited number of men and women presumed to be in good health, that the males had an average total serum protein concentration of 6.9 gm. per 100 cc. while the females, by virtue of higher globulin concentrations, averaged 7.6 gm. per 100 cc. They stated that serum protein values below 6.5 or above 8.4 gm. per 100 cc. may not be considered normal. They also concluded that the serum albumin is most indicative of nutritional condition because it is the fraction which falls most rapidly in protein starvation and that a concomitant increase in the less osmotically effective serum globulin is possible which may mask a reduction in albumin, leaving total protein concentration unchanged. Frisch, Mendel, and Peters (4) using the low-protein diet of Kohman showed that nutritional edema in rats was associated with markedly reduced levels of serum protein. The understanding of the original statements regarding these aspects of blood serum protein levels which arose from the work of Peters and others has remained unaltered, although greatly enlarged by more recent work.

The Starling hypothesis regarding the forces which regulate blood volume, particularly the osmotic role of serum protein, early indicated the importance of protein in maintaining fluid balance and a relation of protein depletion to nutritional edema. More recently the problem appears more complex, for although reduced serum protein levels are frequently associated with nutritional edema (5, 6), there must be many other possible causative or contributory factors. Youmans *et al.* (7) and Keys and co-workers (8) have shown that essentially normal levels of total serum protein may exist in subjects with severe nutritional edema.

The separation of serum protein into its albumin and globulin moieties by "salting out" procedures, and more recently through electrophoretic separation, has been instrumental in clarifying the physiology of serum proteins. Kagan (9) demonstrated that when total serum protein concentration drops below normal, the reduction almost always occurs in the albumin molecules, which are smaller than those of globulin. Conversely, an increase in total serum protein generally consists of a rise in the serum globulin fraction. Studying the effect of reduced protein intake upon serum protein, Bieler, Ecker, and Spies (10) demonstrated with the electrophoretic technique that although both albumin and globulin are reduced in the lowering of total serum protein, the decrease in albumin is somewhat greater than that of globulin. They also found that some globulins, especially the gamma globulins in which some immune bodies are known to reside, are notably resistant to change under these circumstances.

Studies of total blood volume in relation to total protein concentration in the serum have led to the belief that unit concentration of serum protein may be much less significant as an index of protein reserve of the body than is the total quantity of protein circulating in the body. Chang (11) demonstrated, as had Peters, that loss of circulating protein may not be reflected by reduced serum protein concentration owing to a compensatory drop in total blood volume. This type of response to protein depletion

[1] Received for publication March 1, 1948.

has been substantiated by Abbott and Mellors (12), Lyons *et al.* (13), and by Metcoff and coworkers (14), among others.

The use of total serum protein concentration measurements in surveys of populations, with and without fractionation into component albumin and globulins, has been widespread. Youmans *et al.* (15, 16), Milam (17), and Adamson *et al.* (18) are among those who have applied this method extensively. The majority of workers agree with the limits of normal blood serum protein concentration set by Peters and associates (3)—6.5 to 8.4 gm. per 100 cc.—and that concentrations of serum protein below 6.0 gm. per 100 cc. are indicative of pathology except in infants. Under six months of age serum protein concentration normally averages 6.0 gm. per 100 cc. (19) or less (20). In premature infants, during the first four weeks of life the protein values of 3.7 to 5.4 gm. per 100 cc. were found by Hickmans, Finch, and Tonks (21), in contrast to 4.7 to 7.4 gm. per 100 cc. in full-term infants. They found that although during the first two weeks of life most infants have levels of serum protein less than 6.0 gm. per 100 cc., they nearly attain the normal adult level by the tenth week.

Children two and a half to eleven years of age are reported by Rennie (22) to have serum protein concentrations of 6.8 to 8.2 gm. per 100 cc., while in South Carolina, Milam (17) found an average level of 7.1 gm. per 100 cc. in adult white males and a somewhat higher average for Negroes. Youmans *et al.* (16) found in Middle Tennessee poor correlations between the occurrence of low serum protein (or even lowered serum albumin) with signs of nutritional edema and neither of the two appeared most frequently among subjects giving a dietary history of low-protein consumption.

On the other hand, studies by Arnell, Goldman, and Bertucci (23) of women in New Orleans during pregnancy showed that those consuming less than 54 gm. of protein daily frequently showed serum protein concentrations of 6.5 gm. per 100 cc. or less. It is of interest that all cases developing massive edema gave a history of poor protein intake. The added demands for protein in pregnancy emphasize the interrelationship of dietary protein, blood serum protein, and nutritional edema. It is likely that the demands for growth of children's bodies for protein materials may result in more frequent appearance of low serum protein values among poorly nourished children than among adults receiving low-protein diets. Therefore, adequate serum protein concentration in the blood of children should be indicative of an adequate dietary protein allowance.

METHODS

Serum protein concentration was measured in small samples of serum by the method of Lowry and Hunter (24) employing the gradient tube principle for measurement of specific gravity. The groups of children, their environments, and the method of collecting the fasting blood samples and preparing the serum for analysis has been described (25).

RESULTS AND DISCUSSION

To obtain some indication of the day-to-day variation in the serum protein of fasting blood from children, samples were obtained from the youngsters at the Children's Village for three consecutive days in the spring and two consecutive days in the fall.

TABLE 1

Variability in fasting blood serum protein determinations on samples from the same children on consecutive days

CONCENTRATION LEVEL	NUMBER OF DIFFERENCES ACCORDING TO DEVIATIONS										
	0–0.1 gm./100 cc.	0.1–0.2 gm./100 cc.	0.2–0.3 gm./100 cc.	0.3–0.4 gm./100 cc.	0.4–0.5 gm./100 cc.	0.5–0.6 gm./100 cc.	0.6–0.7 gm./100 cc.	0.7–0.8 gm./100 cc.	0.8–0.9 gm./100 cc.	0.9–1.0 gm./100 cc.	1.0+ gm./100 cc.
gm./100 cc.											
8.2–8.4							1				
8.0–8.2							1				
7.8–8.0											1
7.6–7.8	1		2								
7.4–7.6	2	5	4	2	3		1		1		
7.2–7.4	5	3	3	4	3		1				
7.0–7.2	6	4	9	3	2	5	1				
6.8–7.0	6	9	8	3	1		1	1			
6.6–6.8	5	9	3	2		2			1		
6.4–6.6	2	2	1	3	1	1					
6.2–6.4			1	1							
6.0–6.2										1	
Number of differences	27	32	31	18	10	8	6	1	2	1	1
Percentage of total	20	23	23	13	7	6	4	1	1	1	1

Of 137 determinations for consecutive days (Table 1), over 88 per cent (121 pairs) were within the range considered normal, 6.6 to 7.8 gm. per 100 cc. Of all the values for consecutive days, 86 per cent (118 pairs) showed differences of less than 0.5 gm. of protein per 100 cc. of serum, indicating that fasting blood serum protein level is not subject to marked daily changes.

The distribution of the fasting blood serum values for the five groups of children studied is given in Table 2. The means for the different groups were within a narrow range, 6.7 to 7.2 gm. per 100 cc. and above the 6.5 gm. which Bruckman, D'Esopo, and Peters (3) considered a normal minimum for adults. Values between 6.0 and 8.6 gm. were found for children in all groups, but only among the older boys at Boys Republic were values found below 6.0 gm. per 100 cc. Inasmuch as the Boys Republic is a corrective institution, it is believed that the few boys showing low serum protein are not indicative of misfeeding in the whole institution but may be a reflection of malnutrition existing in the boys' histories prior to entering the institution. However, some of the boys had been at the agency for several months which should have been ample time to make up a simple protein deficiency.

Significant differences are not demonstrated between the values found in the spring and in the fall for three groups of children, although some tendency can be noted toward higher levels in the fall determinations. For the children who attended Bay Cliff Health Camp during a period of six weeks in the summer for "nutritional conditioning" (26), the means were identical for the initial and final

TABLE 2

Distribution of children according to levels of fasting blood serum protein

SERUM PROTEIN LEVEL	NUMBER OF CHILDREN IN METHODIST CHILDREN'S VILLAGE			NUMBER OF CHILDREN IN HOLY FAMILY ORPHAN'S HOME			NUMBER OF CHILDREN IN ST. JOSEPH'S HOME			NUMBER OF BOYS IN BOYS REPUBLIC (FALL)			NUMBER OF CHILDREN IN BAY CLIFF HEALTH CAMP		
	Fall*	Spring**	Total†	Fall	Spring	Total†	Fall	Spring	Total†	White	Negro	Total	Initial	Final	Average‡
gm./100 cc.															
8.4							1		1						
8.2															
8.0							1		1				1	1	1
7.8	1	1	2	1		1	5		5				1	3	3
7.6	1		2	2		3	5	4	9				5	5	5
7.4		1	5	5	3	13	6	2	10	1		1	12	12	12
7.2	4	8	15	19	10	40	7	7	15	4		4	21	15	22
7.0	9	4	16	20	17	44	6	13	20	7	3	10	18	24	21
6.8	13	13	35	17	16	45	4	3	9	15	4	19	17	20	25
6.6	4	5	14	10	19	33	5	9	14	8	2	10	10	10	10
6.4	1	2	4	2	6	10	2	3	5	6	1	7	3	1	2
6.2	1		1	1	6	7	2	2	4	3		3	2	1	1
6.0									1				2		
5.8															
5.6										1	1	2			
5.4										1		1			
5.2															
5.0															
4.8															
4.6															
4.4										1		1			
4.2										1		1			
Total children..	34	34	94	77	77	196	44	44	94	48	11	59	92	92	102
	Serum protein (gm./100 cc.)														
Mean.....	6.93	6.97	6.96	7.02	6.83	6.95	7.21	6.95	7.08	6.69	6.76	6.70	7.04	7.08	7.08
Standard deviation.....	.301	.298	.301	.290	.304	.308	.506	.382	.455	.622	.398	.585	.375	.336	.326
Standard error of mean.....	.052	.051	.031	.033	.035	.022	.076	.058	.047	.090	.120	.076	.039	.035	.032

* Averages for two consecutive days.

** Averages for three consecutive days.

† Total for both spring and fall studies, counting some children twice.

‡ One value for each child; may be average of as many as four determinations during the camp period.

determinations, but seven individuals showed concentrations below 6.6 gm. initially, whereas only two showed less than that concentration of serum protein near the end of the camp period.

Accurately weighed composites of the food consumed at the Holy Family Orphan's Home by four representative children during seven consecutive days in the fall and in the spring were analyzed for protein. The results are shown in Table 3 with the fasting blood serum protein values obtained at the same times. The data indicate that the protein consumption of the group of children was lower in the spring than in the fall, and the average levels of fasting serum protein also were slightly lower for the determinations in the spring. At neither time, however, were any of the blood serum values below the normal range. Apparently, the 60 to 90 gm. of protein per day supplied by the dietary provided for the children at Holy Family Orphan's Home were sufficient to maintain levels of protein in the blood within the range accepted as normal (2, 3).

TABLE 3

Intake and fasting blood serum levels of protein

SUBJECT AND AGE (YEARS)	PROTEIN INTAKE		BLOOD SERUM PROTEIN LEVEL	
	Fal	Spring	Fall	Spring
	gm./day	*gm./day*	*gm./100cc.*	*gm./100cc.*
Leroy (8)	80.4		7.2	
Robert (12)	80.7	73.1	6.9	6.7
Judith (8)	72.9		6.8	
Donna (12)	91.6	80.3	7.2	6.7
Shelby (8)		70.3		6.7
Ronald (8)		63.9		7.0

The data for serum protein in fasting blood samples from children in the five groups are given according to age in Table 4, with mean values for males and females, separately, and for all of the subjects studied. There were no significant differences between the serum protein levels of boys and girls in any group, or between the white and Negro boys at Boys Republic. The children less than seven

TABLE 4

Distribution of fasting blood serum protein levels by age of subjects

AGE	CHILDREN IN METHODIST CHILDREN'S VILLAGE				CHILDREN IN HOLY FAMILY ORPHAN'S HOME				CHILDREN IN ST. JOSEPH'S HOME				BOYS IN BOYS REPUBLIC				CHILDREN IN BAY CLIFF HEALTH CAMP				ALL CHILDREN			
	Male		Female		Male		Female		Male		Female		White		Negro		Male		Female		Male		Female	
	Number	Mean fasting blood serum level	Number	Mean fasting blood serum level	Number	Mean fasting blood serum level	Number	Mean fasting blood serum level	Number	Mean fasting blood serum level	Number	Mean fasting blood serum level	Number	Mean fasting blood serum level	Number	Mean fasting blood serum level	Number	Mean fasting blood serum level	Number	Mean fasting blood serum level	Number	Mean fasting blood serum level	Number	Mean fasting blood serum level
yr.		*gm./100 cc.*		*gm./100 cc.*		*gm./100 cc.*		*gm./100 cc.*		*gm./100 cc.*		*gm./100 cc.*		*gm./100 cc.*		*gm./100 cc.*		*gm./100 cc.*		*gm./100 cc.*		*gm./100 cc.*		*gm./100 cc.*
18			2	7.0																			2	7.0
17													1	6.2					1	7.2	1	6.2	1	7.2
16			2	7.0			1	7.1	2	7.0			13	6.7	6	6.8			1	7.2	21	6.8	4	7.1
15	3	7.2	8	7.0	5	6.9					6	7.4	22	6.8	4	6.7	2	7.2			36	6.9	14	7.2
14	4	7.4	1	7.0	6	7.2			2	6.7	5	7.4	11	6.5	1	7.0	1	6.6	1	6.7	25	6.8	7	7.2
13	3	7.0	1	7.0	8	7.0	8	7.0	2	7.6	4	7.5	1	6.4			4	7.2	5	7.3	18	7.1	18	7.2
12	8	6.9	6	6.7	11	7.0	4	7.0	2	7.1	4	7.6					4	6.8	6	7.1	25	7.0	20	7.1
11	5	6.9	8	6.9	6	7.0	4	7.2	5	7.2	1	7.4					12	7.0	5	7.4	28	7.0	18	7.1
10	5	7.0	3	6.7	16	7.0	4	7.0	4	6.7	1	6.8					9	7.0	8	7.2	34	7.0	16	7.0
9	8	6.9	5	7.0	19	7.0	2	6.9	4	6.9	2	7.6					14	7.0	6	7.1	45	7.0	15	7.1
8	6	7.0	7	7.0	14	7.0	6	6.7			2	7.4					4	7.1	6	7.2	24	7.0	21	7.0
7	4	6.9	1	7.5	13	7.0	6	7.0	5	6.7	7	7.0					6	7.0	2	7.2	28	6.9	16	7.1
6	2	6.6	2	6.8	11	7.0	10	6.9	10	6.9	6	7.1					1	7.2	3	6.9	24	6.9	21	6.9
5					10	7.0	8	6.8	2	7.2											12	7.0	8	6.8
4					6	6.9	6	6.9	2	7.8	6	7.0									8	7.1	12	7.0
3					8	6.5	4	6.8	4	6.5	4	6.6									12	6.5	8	6.7
2									2	6.5									1	6.6	2	6.5	1	6.6
Total children...	48		46		133		63		46		48		48		11		57		45		343		202	
Mean serum protein (gm./100 cc.)		7.0		6.9		7.0		6.9		6.9		7.2		6.7		6.8		7.0		7.2		6.9		7.0

years old had slightly lower levels of serum protein but a consistent relationship with age was not found. The means for all groups fall within a remarkably narrow range, 6.7 to 7.2 gm. per 100 cc., with an average of 7.0 gm. per 100 cc.

SUMMARY

Serum protein was determined in fasting blood samples from 390 children, two to eighteen years old, in the care of five Michigan agencies. One hundred fifty-five of the children were studied twice, once in the fall and again in the spring.

In the subjects studied, significant differences were not found between mean values for males and females, those for white and Negro boys, or between determinations made near the beginning and end of six weeks in a health camp. The levels of serum protein showed no consistent relationship with age. The mean of all fasting blood serum protein values was 7.0 gm. per 100 cc., and all but five of the subjects showed levels between 6.0 and 8.6 gm. per 100 cc.

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80 Per Cent of U.S. Families Use Margarine

A survey conducted by Industrial Surveys Company, Inc., of New York City shows that some 31,839,000 families—or 80 per cent of the total—in the U.S. use some margarine in their diet. This figure is 15 per cent above that of two years ago. In four states, regulations virtually prevent the sale of margarine. If findings in these states were excluded, the percentage of families using margarine would increase to 85 per cent.—*Food Field Reporter, February 16, 1948.*

Nutritional Status of Children

VI. Blood Serum Vitamin A and Carotenoids[1]

ABNER ROBINSON, MARJORIE LESHER, ANN P. HARRISON, ELSIE Z. MOYER, MARY CATHERINE GRESOCK, and CLARIBEL SAUNDERS

Research Laboratory, Children's Fund of Michigan, Detroit

VITAMIN A has been known since the early work of McCollum and Davis (1), and Osborne and Mendel (2) showed it to be an indispensable material for growth and health in animals. In 1913 it was reported to be essential to the integrity of the epithelial tissues preventing xerophthalmia (3), one of the first known signs of this specific vitamin deficiency. Under the influence of vitamin A deficiency, the normal cuboidal and columnar epithelium of the mucous membranes in many parts of the body were shown by Mori (4) and by Wolbach and Howe (5) to undergo a change to the stratified, keratinized type. It is this altered epithelium which permits entrance of infective agents to set up inflammatory processes. On the clinical side, the belief that ample supplies of vitamin A may guard against entry of infective agents has led to many conflicting reports as to the effectiveness of vitamin A in reducing the incidence and shortening the course of upper respiratory infections (6).

More recently, specific roles of vitamin A in the body have been recognized. Wald (7) and others demonstrated that vitamin A in combination with a protein material makes up the rhodopsin, or visual purple, of the retina of the eye. The bleaching of this substance by light constitutes the fundamental chemical process in the rods and cones which underlie the visual process. One of the earlier signs of inadequate vitamin A is failure of vision in dim light (8), and measurement of dark adaptation ability of the eye has been used for some years as a means of detecting vitamin A deficiency (9), although the specificity of the method as well as its sensitivity have been questioned (10).

The work of Mellanby (11) has revealed the importance of vitamin A in controlling the activity of the bone-forming cells, particularly the bone rarifying cells (osteoclasts) which, with the bone-forming cells (osteoblasts), produce correct bone form during growth. Mellanby showed with young animals that in vitamin A deficiency very dense bones are found. Cranial bones show marked density and overgrowth, and the cavities and foramina containing the central nervous system do not expand properly to accommodate the growing tissues, producing nerve damage by compression as well as by skeletal malformation.

The vitamin A problem is complicated by the fact that certain carotenoid pigments in food are converted to vitamin A in the body and serve as sources of additional amounts of this indispensable material. The human body has the capacity of storing vitamin A, particularly in the liver. For this reason, restricted intake of vitamin A will not produce vitamin A deficiency as rapidly as ascorbic acid limitation will cause scurvy, and blood levels of vitamin A will not respond as rapidly to lowered dietary intake of the vitamin as do the blood levels of vitamin C when intake is restricted.

Dietary supplies of vitamin A may be expected to vary significantly from one season to another. Butter—one of the few rich sources of preformed vitamin A in a diet (except fortified margarine)—has been shown by Ellenberger, Guerrant, and Fardig (12) to have significantly lower vitamin A potency in the winter months when green pasturage is not available. More important than vitamin A itself in satisfying needs for this nutrient are the carotenoid pigments of certain green and yellow vegetables and fruits. Moore (13) has pointed out that these being the less expensive sources of vitamin A, they are the most significant ones in the diet. The carotenes which are converted to vitamin A in the body are stored in the liver and when consumed appear also in the blood serum.

It is difficult to assess the vitamin A value which the mixed carotenes of any diet may contribute. Of the several carotenes, some are well and extensively converted into vitamin A when they enter the body; others are but poorly converted, if at all, according

[1] Received for publication March 4, 1948.

to Heilbron, Jones, and Bacharach (14). Orent-Keiles *et al.* (15) have reported: "It appears that the vitamin A value of kale as determined by bioassay is about two-thirds of the value measured spectrophotometrically after chromatographing. On the other hand, when the carotenoid pigments are completely extracted from kale and this extract is used as the vitamin A supplement instead of kale itself, the bioassay gives a vitamin A value of only 6 per cent less than that obtained by the chemical method." Thus, beta-carotene has twice the potential of alpha-carotene as a source of vitamin A. Also, the carotenes from vegetable sources are not entirely available to the body, owing to incomplete intestinal absorption. In human subjects absorption may be expected to be even poorer. Kreula (16) found 50 to 70 per cent absorption of carotene when administered in oil, but the carotene in grated raw carrots included in a fat-free diet was only 10 per cent available, or less. Similar results were obtained by the Vitamin A Sub-Committee of the Accessory Food Factors Committee in England (17), which found that human subjects in vitamin A depletion absorbed 25 per cent of the carotene of carrots and 40 per cent of the carotene of spinach. Morton (18) has found that carotene is more efficiently utilized as a source of vitamin A by depleted than by well-fed animals.

The interpretation of data on serum concentrations of vitamin A and carotenoids as they relate to nutritional status is complicated. It is known that blood carotenoids drop rapidly over a period of one week when a carotene-free and vitamin-A-free diet is given (17, 19, 20), but many months of a deficient diet are required to depress appreciably the serum vitamin A level. Malnourishment is frequently associated with low serum vitamin A levels (21, 22), and Yarbrough and Dann (23) have demonstrated lower average vitamin A levels in the blood of low-income groups than among the high-income groups. On the other hand, not all persons showing commonly accepted clinical signs of vitamin A deficiency exhibit lowered blood levels of this substance, and dark adaptation measurements may show poor correlation to blood levels of vitamin A (24, 25). Research with rats has demonstrated (26) that the level of vitamin A in the blood may not necessarily parallel the level of vitamin A stores in the liver, for, in the animals, the vitamin A in the liver may be greatly depleted before an appreciable drop in blood vitamin A occurs. However, Popper and Steigmann (27, 28) demonstrated that when pathological changes prevent mobilization of vitamin A stores during liver disease, vitamin A may disappear from the blood, yet liver stores remain very high.

When massive doses of vitamin A are given in a single dose, the level in the blood may rise to slightly above normal, but the higher level is only temporary (29–31). After administration of 100,000 I.U. of vitamin A, the blood level will return to normal levels in 24 hr., presumably owing to the great capacity of liver to store the vitamin (31).

The British vitamin A committee (17) has made long-term studies of vitamin A depletion in human subjects in an attempt to establish normal and pathological levels of serum vitamin A. Twenty-three well nourished subjects with initial serum levels of about 90 I.U. of vitamin A per 100 cc. of serum were given a vitamin-A-free and carotene-free diet. Within the first year on the deficient diet, none revealed depletion by either dark adaptation tests or serum vitamin A estimations, but the serum carotenoid levels fell rapidly. During the second year of restricted feeding, the serum vitamin A of some subjects declined slowly, reaching 30 I.U. per 100 cc. The report suggests that while dark adaptation tests were not entirely satisfactory, a serious impairment

TABLE 1

Reproducibility of vitamin A and carotenoids determinations in duplicate blood serum samples

BLOOD SERUM LEVEL	NUMBER OF DUPLICATE DETERMINATIONS ACCORDING TO DIFFERENCES BETWEEN THEM						
	0–2 mcg./ 100 cc.	2–4 mcg./ 100 cc.	4–6 mcg./ 100 cc.	6–8 mcg./ 100 cc.	8–10 mcg./ 100 cc.	10–12 mcg./ 100 cc.	12–14 mcg./ 100 cc.
Vitamin A*							
mcg./100 cc.							
45–50		6	1	1			
40–45	6	5	2	2	4		
35–40	8	8	4	2	2	1	1
30–35	4	6	5	2	2		
25–30	7	2		1	1		
20–25	1	2	3		1		1
15–20							
10–15		1					
Number of differences	26	30	15	8	10	1	2
Percentage of total	28	33	16	9	11	1	2
Carotenoids**							
200–220							
180–200	3	3					
160–180	2	1	4	2	1	1	1
140–160	4	4	3	1	2		1
120–140	4	1	3	4		1	
100–120	2	5	1	2	1	1	
80–100	5	2	4	1	1		1
60–80	2	1	1				
40–60	1			1			
Number of differences	23	17	16	11	4	2	3	1	2
Percentage of total	29	21	20	14	5	3	4	1	3

* 92 duplicate samples.

** 79 duplicate samples.

of dark adaptation may be expected when serum levels fall to 40 I.U. per 100 cc.

Differences of opinion have arisen as to the daily requirements of human beings for vitamin A. Booher (32), using the prevention of hemeralopia in the adult as an indicator, found the minimal adult requirement to be between 20 and 30 U.S.P. units per kilogram of body weight per day, or 1400 to 2000 units for a man weighing 70 kg. This compares well with the British vitamin A committee finding of approximately 1300 I.U. of preformed vitamin A or 2600 I.U. of beta-carotene in oil as being curative for human adults in depletion (17). In contrast, Jeghers (9), who studied dietary histories of medical students and used dark adaptation tests, found that 4000 I.U. of vitamin A daily is a minimum and 6000 I.U. is an advisable level to permit a reasonable margin of safety in feeding.

The accurate definition of human requirements for vitamin A is contingent upon development of acceptable means of measuring and expressing vitamin A potency. At present, tables of analytical values for common foods give only the total vitamin A potencies, which provide no information concerning the portions derived from carotene, or, usually, the method by which alpha- and beta-carotene were calculated. Agreement has not been obtained on a reliable factor for converting micrograms of vitamin A and carotene determined by spectrochemical methods to International Units of vitamin A. The Food and Nutrition Board of the National Research Council recommended dietary allowances (33) of vitamin A which were thought to be ample whether supplied as carotene or preformed vitamin A.

TABLE 2

Variability of blood serum vitamin A determinations on samples from the same children on consecutive days

CONCENTRATION LEVEL	NUMBER OF DIFFERENCES ACCORDING TO DEVIATIONS							
	0–2 mcg./100 cc.	2–4 mcg./100 cc.	4–6 mcg./100 cc.	6–8 mcg./100 cc.	8–10 mcg./100 cc.	10–12 mcg./100 cc.	12–14 mcg./100 cc.	14–16 mcg./100 cc.
mcg./100 cc.								
60–65								1
55–60								
50–55								
45–50	2	3	1	1	1		3	
40–45	2	5		1	3		1	3
35–40	2	1	2	1	2	2		1
30–35	5	4	2	4	3		1	3
25–30	3	1			2		1	1
20–25	1		1		1	1		
15–20				1		1	1	
Number of differences	15	14	6	8	12	4	7	9
Percentage of total	20	19	8	11	16	5	9	12

METHODS

As a part of the nutritional status studies of children in the care of Michigan agencies, a survey was made of the fasting levels of vitamin A and carotenoids in the blood serum of 348 subjects. Measurements were made at different seasons and on successive days, to permit evaluation of the influence of seasonal changes in the dietary pattern and the extent to which daily variation in fasting blood serum protein may be expected in children. In addition, it was possible to analyze for vitamin A and carotene the food consumed by selected subjects during the periods of blood sampling.

The methods of collecting fasting blood samples and representative diets and of preparing the blood serum and food material for vitamin A and carotene analyses have been presented and the background and environment of the five groups of children studied have been described (34).

The blood serum was analyzed for vitamin A and carotenoids by the methods of Bessey and coworkers (35), using a Beckman spectrophotometer adapted to examination of small quantities of solution as described by the same authors (36). Analyses were made in duplicate except in a few instances of insufficient samples. Food composites were analyzed for vitamin A by the Carr-Price (37) reaction and for carotene spectrophotometrically, after removal of interfering pigments by chromatography. The methods of extraction and analysis of food were described by Lesher *et al.* (38).

RESULTS AND DISCUSSION

Table 1 presents the variations found in analyses of duplicate samples for vitamin A and carotenoids. The average deviation of samples from their duplicates was 4.2 mcg. per 100 cc. of serum for carotenoids and about 3.6 mcg. for vitamin A. Inasmuch as carotenoids in serum are determined by direct absorption and vitamin A is determined by a measurement of difference, greater variation would be expected in the method for vitamin A determination.

The variability of vitamin A and of carotenoids in fasting serum blood samples taken from the same subjects (Methodist Children's Village) on consecutive days are presented in Tables 2 and 3. Table 1 shows greater variability on consecutive days than could be attributed to method alone and indicates substantial day-to-day variations in the amounts of these two nutriments in the blood stream. The average deviations per 100 cc. of blood serum were 14 mcg. for carotenoids and 7 mcg. for vitamin A.

The distribution of fasting serum levels of carotenoids found for children in the five groups and at different seasons are presented in Table 4. Inasmuch as carotene is thought to be effective in the organism only after its conversion to vitamin A, there is no basis for judging the adequacy of serum caro-

TABLE 3

Variability of blood serum carotenoid determinations on samples from the same children on consecutive days

CONCENTRATION LEVEL	NUMBER OF DIFFERENCES ACCORDING TO DEVIATIONS					
	0–10 mcg./ 100 cc.	10–20 mcg./ 100 cc.	20–30 mcg./ 100 cc.	30–40 mcg./ 100 cc.	40–50 mcg./ 100 cc.	50–60 mcg./100 cc.
mcg./100 cc.						
260–280		2	1			
240–260	1	2	1			
220–240		1				
200–220	3		1	1		
180–200	4	3		1		
160–180	8	4	3	1		
140–160	8	3	1			1
120–140	5	7	1	3		
100–120	6	9			1	
80–100	5	3				1
60–80				1		
Number of differences	40	34	8	7	1	2
Percentage of total	43	37	9	8	1	2

tenoid levels. On the other hand, an ample level of serum carotenoids suggests that this material is available in the diet in substantial amount. The data for the five groups differ markedly, the children at Holy Family Orphan's Home and St. Joseph's Home showing consistently lower levels of fasting blood serum carotene than the other groups, indicating a difference in dietary pattern. For individuals dependent upon carotene for a large part of their vitamin A, it is possible that winter may be a period of considerably lowered intake of vitamin A.

That blood serum levels of carotenoids may rise fairly rapidly under favorable circumstances is demonstrated by the marked increases by the children at Bay Cliff Health Camp (Fig. 1) during the six weeks which their environment and diet were excellent and included plentiful amounts of milk, fruit, and fresh green and yellow vegetables. The average level of serum carotenoids early in the camp period was 137 mcg. and at the end 168 mcg. per 100 cc. Initially only 27 per cent of the group had serum carotenoid levels above 160 mcg. per 100 cc., but after four to five weeks 55 per cent had risen to that level.

TABLE 4

Distribution of children according to levels of blood serum carotenoids

SERUM CAROTENOIDS LEVEL	NUMBER OF CHILDREN IN METHODIST CHILDREN'S VILLAGE			NUMBER OF CHILDREN IN HOLY FAMILY ORPHAN'S HOME			NUMBER OF CHILDREN IN ST. JOSEPH'S HOME			NUMBER OF BOYS IN BOYS REPUBLIC	NUMBER OF CHILDREN IN BAY CLIFF HEALTH CAMP		
	Fall*	Spring**	Total†	Fall	Spring	Total†	Fall	Spring	Total†	Fall	Initial	Final	Average††
mcg./100 cc.													
320–340	1		1										
300–320										1	1		
280–300													
260–280	2		2										1
240–260	1	2	4								1	8	2
220–240	4		4				1		1	2	1	6	4
200–220	3	2	7						1	1	5	10	10
180–200	2	4	10		1	1	2		2	3	8	10	9
160–180	9	1	13		3	4	2	2	4	5	7	13	16
140–160	6	5	17	3	6	9	4	1	8	4	14	11	16
120–140	2	7	13	3	5	18	10	6	17	13	16	11	18
100–120	1	9	11	17	6	38	6	6	15	10	13	11	16
80–100	1	2	6	15	15	47	4	8	18	2	11	4	6
60–80			1	6	7	28	3	5	10	2	8	1	1
40–60				1	2	9		4	4	2			
Total children..	32	32	89	45	45	151‡	32	32	80	45	85	85	99
Carotenoids(mcg./100 cc.)													
Mean	185	146	161	100	108	100	127	99	113	137	137	168	155
Standard deviation	50	41	48	22	35	28	36	29	36	48	47	46	43
Standard error of mean	9	7	5	3	5	2	6	5	4	7	5	5	4

* Average of determinations on three consecutive days.

** Average of determinations on two consecutive days.

† Total for both spring and fall studies, counting some children twice.

‡ One value for each child; may be average of as many as four determinations during camp period.

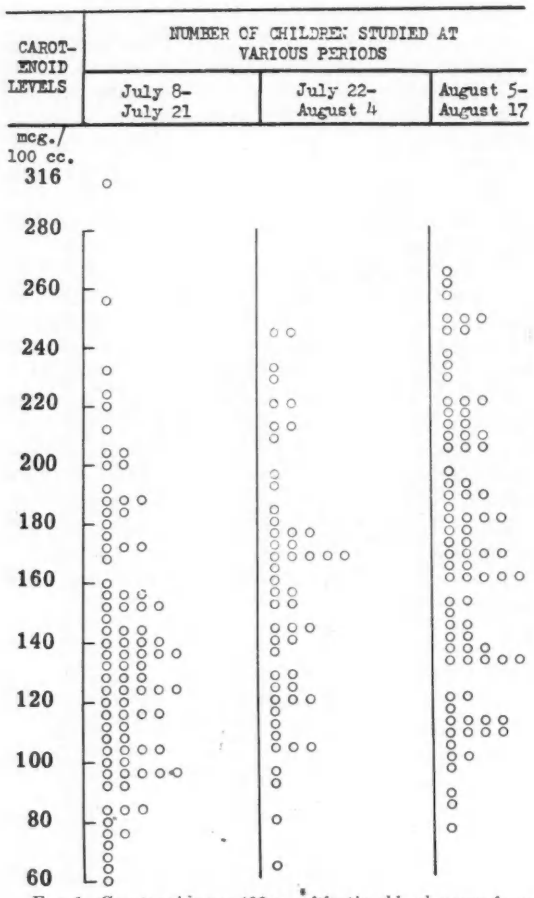

FIG. 1. *Carotenoids per 100 cc. of fasting blood serum from children during first week, in the third and fourth weeks, and after four weeks at Bay Cliff Health Camp.*

The data for fasting blood serum vitamin A are presented in Table 5. The group averages tend to be more uniform than those for carotenoids, with the subjects of the Methodist Children's Village showing a consistently higher average than those for the other groups. Few of the subjects were entirely dependent upon the usual dietary sources of vitamin A, since cod-liver oil was routinely given to the children at the Methodist Children's Village, Holy Family Orphan's Home, and St. Joseph's Home in amounts approximating 2500 I.U. per day per child. In view of this liberal supplementation, it is surprising to find evidence of a seasonal shift in serum vitamin A. At the Methodist Children's Village in the fall, all subjects had serum levels of vitamin A above 30 mcg. per 100 cc., but in the spring 30 per cent of the children showed less than 30 mcg. per 100 cc. Of the children at Holy Family Orphan's Home, 38 per cent in the fall and 60 per cent in the spring had less than 30 mcg. of vitamin A per 100 cc. of serum.

The "nutritional conditioning" which may occur in a short time under conditions of improved environment and diet was discussed with respect to vitamin C in a preceding paper (39) and is emphasized by the determinations of serum vitamin A for the same children (Fig. 2). Among the children who attended Bay Cliff Health Camp, 42 per cent had initial levels of serum vitamin A below 30 mcg. per 100 cc., but only 27 per cent of the final values were at or below this level. The greatest increases in blood vitamin A occurred in the children whose initial levels were lowest, while those subjects with good initial levels of vitamin A (above 30 mcg. per 100 cc.) showed smaller increases and in some instances a reduction. The shift of blood vitamin A levels, while not as great, was similar to the change in carotenoid values (Fig. 1).

Study of the correlation of fasting serum vitamin A and carotenoid levels of the children did not reveal a relationship, nor was any correlation found between either the values for vitamin A or carotenoids and levels of hemoglobin, serum vitamin C, serum protein, or serum alkaline phosphatase in blood from the same groups of children. A relationship was not found between serum vitamin A or carotenoids and age or the rate of gain in either weight or height.

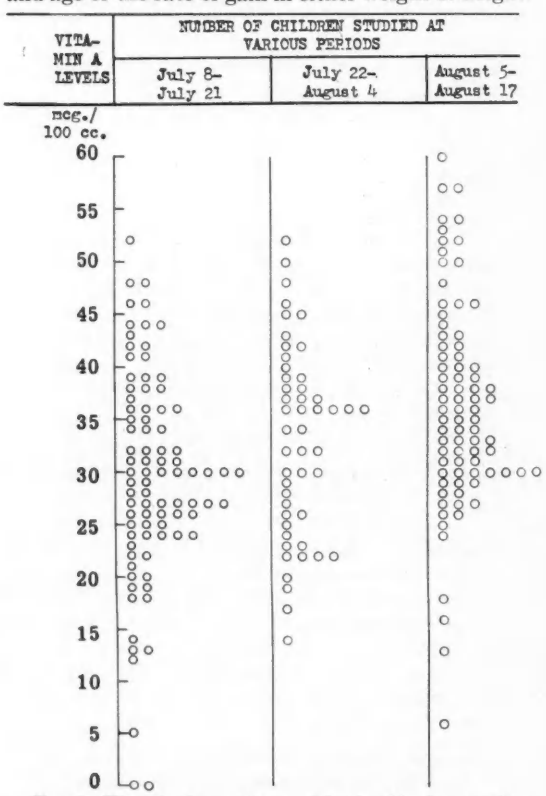

FIG. 2. *Vitamin A per 100 cc. of fasting blood serum from children during first week, in the third and fourth weeks, and after four weeks at Bay Cliff Health Camp.*

SUMMARY

The levels of vitamin A and carotenoid pigments were determined in the fasting blood serum of 358 children two to eighteen years old in the care of five Michigan child-caring agencies, using the Bessey and Lowry microchemical techniques.

Data were obtained showing the variability between analyses of duplicate samples, of fasting serum samples taken from the same subject on consecutive days, and of samples taken in the fall and spring.

The various groups of children differed markedly in level of blood carotenoids, suggesting differences in dietary patterns. A seasonal difference was evident for vitamin A, the autumn values being higher than spring values. Rises in levels of serum carotenoids and vitamin A were found in response to favorable circumstances and ample supplies of fresh green and yellow vegetables provided during a six-week camping experience.

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TABLE 5

Distribution of children according to levels of blood serum vitamin A

SERUM VITAMIN A LEVEL	NUMBER OF CHILDREN IN METHODIST CHILDREN'S VILLAGE			NUMBER OF CHILDREN IN HOLY FAMILY ORPHAN'S HOME			NUMBER OF CHILDREN IN ST. JOSEPH'S HOME			NUMBER OF BOYS IN BOYS REPUBLIC	NUMBER OF CHILDREN IN BAY CLIFF HEALTH CAMP		
	Fall	Spring	Total*	Fall	Spring	Total*	Fall	Spring	Total*	Fall	Initial	Final	Average**
mcg./100 cc.													
135–140										1			
120–125										1			
85–90										1			
70–75								1	1				
65–70	1		1						1				
60–65					1	1				1		1	
55–60								1	4	1		2	
50–55	1		3	1		3	1	3	5	5	2	8	2
45–50	8	2	11		1	5	4	3	7	3	6	2	8
40–45	6	2	9	3	5	16	2		4	2	8	12	9
35–40	5	6	18	10	5	24	7	6	15	4	13	16	22
30–35	5	7	18	12	5	32	6	4	14	7	17	17	21
25–30		7	12	9	9	27	6	3	12	4	14	11	24
20–25		2	6	5	8	25	2	4	7	5	11	3	4
15–20				2	4	8	2	2	5	4	4	4	4
10–15					3	5		2	2		2	2	2
5–10					1	3		1	1	2	1	1	
0–5						1				3	1		1
Total children..	26	26	78	42	42	150	30	30	78	44	79	79	97
						Vitamin A(mcg./100 cc.)							
Mean.....	42	33	36	31	29	30	34	34	35	37	31	35	33
Standard deviation.....	7	7	8	7	11	10	8	15	12	27	10	11	9
Standard error of mean.....	1	1	1	1	2	1	1	3	1	4	1	1	1

* Total for both spring and fall studies, counting some children twice.

** One value for each child; may be average of as many as four determinations during camp period.

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Obesity in Children

Mothers sometimes explain fatness of children by talking of "lazy glands." In most such cases, careful questioning is usually rewarded by the discovery that the mother has been instructed to prevent all physical activity on the part of her child, who has just passed through an illness that was thought to have caused heart disease. Even though activity is cautiously increased months later, the young patient continues to be taught to avoid exercise and to guard against heart strain. The mother, not realizing that the need of food is greatly reduced in such circumstances, and still under the sway of the time-honored belief that recovery will be greatly enhanced by full feeding, spares no effort to tempt the child to eat. The young patient, suffering from self-pity and egoism, accepts the food even though he has no inherent desire for it.—*From an address given at the Army Medical Center, Washington, by Dr. L. H. Newburgh, Department of Medicine, University of Michigan Medical School, Ann Arbor.*

Ascorbic Acid Content of Food Served in a Royal Canadian Air Force Mess[1]

SQUADRON LEADER H. D. BRANION[2] and FLIGHT SERGEANT C. R. CAMERON

Number 1 Nutritional Laboratory, Medical Branch, Royal Canadian Air Force

THE daily allowance of ascorbic acid recommended by the Canadian Council on Nutrition and the Food and Nutrition Board of the National Research Council, Washington, is 75 mg. per day for the average adult.[3] As a part of an attempt to obtain the recommended allowance of all nutrients for Royal Canadian Air Force personnel, four laboratories were established by the Medical Branch to assay for various constituents, including ascorbic acid, the food as served for a five-day period at the various R.C.A.F. stations across Canada. To obtain further information in regard to the seasonal variation in the available ascorbic acid, daily assays of the food as served at one station[4] were made by No. 1 Nutritional Laboratory over a period of twenty months, beginning in March, 1943. It is believed that the information obtained, representing over twelve hundred assays for ascorbic acid on a station feeding about 1500 personnel at each meal, is of value from the standpoint of human nutrition generally.

The ration issued to R.C.A.F. personnel was designed by the Standing Committee on Nutrition of the Department of National Defence, who advises the Minister on matters relating to rations for the Armed Forces in Canada and elsewhere. During the period of this study, this ration, as revised in June, 1942, was essentially as follows:

Meat: 12 oz. per day, such as beef, pork, mutton.
Bacon: 2 oz. per day.
Eggs: 6 to 9 per week in lieu of some of the bacon and some meat.
Lard: ½ oz. per day.
Butter: 1⅓ oz. per day.
Cheese: ⅔ oz. per day.
Milk (fresh, pasteurized): 15 oz. per day.
Milk (whole, evaporated, irradiated): 2½ oz. per day.
Bread (Canada Approved): 12 oz. per day.
Vegetables: 8 oz. per day.
Potatoes: 14 oz. per day.
Tomatoes (fresh or canned): 6 oz. twice a week (compulsory).
Orange: 1 per week (compulsory).
Grapefruit juice: 5 oz. twice a week (compulsory).
Apple juice (fortified): 5 oz. once a week (compulsory).
Tomato juice: 6 oz. once a week (compulsory).
Apples: 2 per week (compulsory).
Sugar: 1½ oz. per day.
Rolled oats: 1½ oz. per day.
Peas, split: 1 oz. per day.
Rice: 1 oz. per day.
Jam: 2¼ oz. per day.

In addition, tea, coffee, salt, vinegar, salad oil, and various spices and condiments were issued. Many alternatives were available in each class of foods. Fish could replace meat. Flour could be drawn instead of bread. Cracked or rolled wheat could be substituted for rolled oats. For split peas—beans or dried whole peas could be substituted. For jam—raisins, corn sirup, prunes, molasses, honey, maple sirup, or cane sirup could be drawn. For rice, the alternatives were macaroni, spaghetti, barley, or corn starch.

PROCEDURE

Samples of the food as served were collected in two bottles. In the first bottle was placed an average serving—as determined by observation and weighing or measuring several servings—of tomatoes, tomato juice, grapefruit juice, oranges, or fortified apple juice. Occasionally, orange juice or grapefruit were served; these were also collected in this bottle. All of these foods contain relatively large amounts of ascorbic acid. In the second bottle was placed an average serving of all other ascorbic-acid-containing foods. These were: raw, preserved, or

[1] Received for publication January 13, 1947.

[2] Present address, Department of Animal Nutrition, Ontario Agricultural College, Guelph, Ontario, Canada.

[3] Recently, the Canadian Council of Nutrition (1) adopted the following statement: "Ascorbic Acid. Average intakes of . . . 50 mg. per day for adults appear to be sufficient."

[4] We are indebted to Flight Officer Stacey and Section Officer Hayden, Messing Officers of No. 4 Wireless School, Guelph, Ontario, for their assistance and cooperation in this project. In addition, we gratefully acknowledge the help of the staff of the Mess at No. 4 Wireless School and the staff at No. 1 Nutritional Laboratory.

TABLE 1

Average daily ascorbic acid intake

DATE OF ASSAY	ASCORBIC ACID		
	Fruits and juices	Other ascorbic-acid-containing foods	Total
	mg.	*mg.*	*mg.*
1943			
March	34.3	28.1	62.4
April	45.0	20.4	65.4
May	47.2	14.4	61.6
June	40.9	18.1	59.0
July	35.1	39.1	74.2
August	36.9	62.0	98.9
September	23.7	45.6	69.3
October	21.6	43.3	64.9
November	28.9	33.1	62.0
December	49.5	34.8	84.3
1944			
January	53.2	26.3	79.5
February	43.5	15.7	59.2
March	51.4	26.5	77.9
April	59.6	19.6	79.2
May	41.8	20.2	62.0
June	34.0	22.7	56.7
July	41.2	39.1	80.3
August	36.1	52.9	89.0
September	36.5	43.8	80.3
October	40.4	38.7	79.1
Average.....	40.0	32.2	72.2

cooked fruits; vegetables[5]; jams; fruit sauces; and fruit pies. Pickles, ketchup, vegetable soup, stew containing vegetables, meat pie with vegetables, and any other food dish containing vegetables were also collected in this bottle. Foods known to contain negligible amounts of ascorbic acid were not collected, for it was felt that inclusion of such foods would so lower the concentration of ascorbic acid that the accuracy of the assay would be impaired.

To both bottles an amount of 3 per cent metaphosphoric acid approximately equal in volume to the contents was added at the end of each meal, and the bottles were stored in a refrigerator between collections. Assays were made immediately after the conclusion of the third meal each day. The determinations for free ascorbic acid were made by a method of Jackson (2) based upon that of Evelyn, Malloy, and Rosen (3). This dichlorophenolindophenol method was used by all R.C.A.F. Nutritional Laboratories for ascorbic acid assays. Other studies carried out in this and other R.C.A.F. Laboratories have shown that up to 24 hr. and, in most cases, 36 hr. after the collection of the third meal, there is no appreciable loss of ascorbic acid under these conditions.

[5] With the exception of beets, since their color interferes with the determination of ascorbic acid.

RESULTS AND DISCUSSION

The results are shown in Table 1 and Figure 1. It will be noted that the average daily intake of ascorbic acid from the fruits and fruit juices usually varied from 30 to 50 mg. per day, although during one particular three-month period, the average daily intake was below this range. This was due largely to a scarcity of canned grapefruit juice which had to be imported. To make available a Canadian fruit drink containing a comparable amount of ascorbic acid, apple juice was fortified with ascorbic acid so that it contained not less than 35 mg. per 100 gm. of juice. Five oz. of this fortified apple juice were served once a week, supplying 49 mg., or an average of 7 mg. per day. This was approximately one-tenth of the total ascorbic acid supplied.

Some explanation of the variation in the amount of ascorbic acid supplied by the fruits and juices would seem warranted. When any one of the items—oranges, grapefruit juice, apple juice, or tomato juice—was not available, due to supply difficulties, any of the other items could be issued in lieu. For example, if grapefruit juice were not available, then tomato juice could be substituted. These commodities are not mutually replaceable on a basis of ascorbic acid content. In the R.C.A.F. messes, over the period from 1942 to 1945, the average ascorbic acid content of oranges was 52 mg. per 100 gm., of grapefruit juice, 33 mg.; of tomato juice, 15 mg.; and of fortified apple juice, 39 mg. Canned tomatoes averaged 17 mg. of ascorbic acid per 100 gm. In addition, there was some variation in the size of the serving of these commodities. Theoretically, 5 or 6 oz. of juices were available four days per week. However some personnel did not drink these juices, thus allowing the rest of the personnel a larger serving. Further, one orange per week was drawn for each individual. Not only was there some variation in size at different times of the year, but often half of the orange was served at breakfast, and the other half was used for dessert in some form, at another meal. In this case, half of its ascorbic acid content was assayed as "fruits and juices" and the other half as "other ascorbic-acid-containing foods."

From Table 1 and Figure 1, it will be observed that there was a marked seasonal variation in the available ascorbic acid in the foods other than the above noted fruits and fruit juices. There was a gradual fall in the ascorbic acid content of the ration during the first six months of the year, followed by a rise in July and August, and then a gradual drop again in the fall. This was due to two things: first, the greater variety of vegetables available during the summer and early autumn and second, the gradual loss of ascorbic acid from vegetables during storage. This appears to be true to a lesser degree in the case of cabbage and even after several

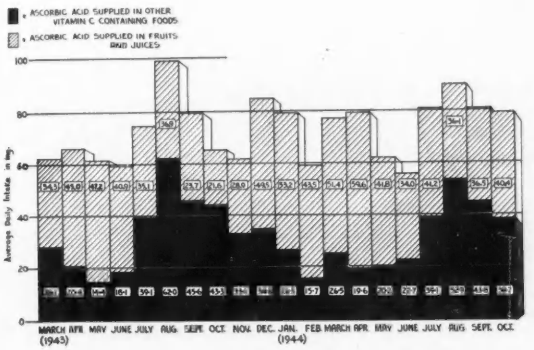
ASCORBIC ACID SUPPLIED IN OTHER VITAMIN C CONTAINING FOODS
ASCORBIC ACID SUPPLIED IN FRUITS AND JUICES
Average Daily Intake in mg.
100
80
60
40
20
0
MARCH APR MAY JUNE JULY AUG SEPT OCT NOV DEC. JAN. FEB MARCH APR MAY JUNE JULY AUG SEPT. OCT.
(1943)
(1944)

FIG. 1. *Average daily intake of ascorbic acid over a period of twenty months at Number 4 Wireless School of the R.C.A.F.*

months' storage this vegetable makes a very valuable contribution to the intake of ascorbic acid. Raw cabbage is an excellent source of ascorbic acid, running about 50 to 60 mg. per 3½ oz. Additional studies in this laboratory (4) have shown that the loss in the ascorbic acid content of cabbage even when properly cooked in large quantities, with a minimum amount of water and for a short time, is high, averaging about 70 per cent. Steaming resulted in a similar loss. Improper cooking methods may result in losses as high as 90 per cent.

As further evidence of the importance of tomatoes, tomato juice, and citrus fruits or juices in the provision of an adequate intake of ascorbic acid, 230 assays of all food as served for a five-day period in the various R.C.A.F. messes situated across Canada showed an average content of 71.1 mg. of ascorbic acid per day. Of this amount, fruit and fruit juices supplied no less than 47.5 mg., whereas the remainder of the food furnished only 23.6 mg. per day.

Several nutritional surveys conducted in various parts of Canada (5–10) have indicated that the ascorbic acid intake in the food of Canadians is far below the recommended allowance of 75 mg. per day. Waagen and Pett (11) concluded that only from June to October did the diets of university students in residence reach standard recommendations without an appreciable supplement of citrus fruits. In addition, the average fasting blood ascorbic acid level of Canadians on enlistment in the R.C.A.F. indicates a low ascorbic acid intake for many months of the year (12).

CONCLUSION

If the level of ascorbic acid intake recommended by the Canadian Council on Nutrition and the Food and Nutrition Board, National Research Council, Washington, is to be reached, at least in large scale feeding, the daily intake of liberal amounts of raw cabbage, fresh or canned tomatoes, tomato juice, or citrus fruits and juices is necessary.

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Techniques of Health Education

We would think it strange indeed if a physician asked a patient what his pulse rate should be instead of counting it. Yet we do much the same thing when we evaluate health instruction on an informational test. The child who knows he should drink milk but doesn't isn't helping his health.

Teaching for better health behavior requires a different approach than teaching just health facts. The latest psychology of learning gives a clue to the approach. It states, in part, that behavior is changed as the individual solves a problem that is real to him. Boys and girls do have some real problems. When we show them how better health behavior solves these problems, our health instruction is of real value.—*Arthur J. Lewis, Jr., Supervising Teacher, Health Education, Denver Public Schools,* in *Nutrition News, February, 1948.*

Editorial

BOSTON IN OCTOBER

Of course, you are coming to Boston
The land of the Cabot and Cod,
Of Adamses, Lobster and Harvard,
The soil that the Pilgrims once trod.

You may, if you like, go to Gloucester,
To Plymouth to gaze at the rock.
You might catch a fish in the ocean,
But don't miss that boat from the dock!

Oh yes, why of course, there are meetings,
Just to fill in the time between trips,[1]
We won't try to tempt you to miss them,
Not even with schooners and ships!

Twelve years ago in the May, 1936 issue the above poem first appeared in this JOURNAL, as an invitation to dietitians to attend the 19th Annual Meeting of the American Dietetic Association. It is reprinted here, for again Boston beckons the members and friends of this Association—this time for its 31st Annual Meeting. In the intervening years, the Association and dietetics has come of age. In size alone, the membership has grown from 521 to more than 8000—doubling itself four times, until it is now sixteen times that of 1936. In other ways, too, dietetics has acquired stature, until it is now a recognized profession.

With growth and maturity, however, the values of early years remain and reflect a continuity which will be readily observable to those who attended the first meeting in Boston of the American Dietetic Association. Many of the members of the Massachusetts Dietetic Association who helped to make that meeting so memorable will again be in the roles of committee members who oil the wheels behind the scenes.

Alice M. Fenno of Harvard University Graduate School of Business Administration and Ruth W. Spencer of the Veterans Administration are serving as co-chairmen of the convention. Helen Baughman and Edith Hoadley are co-chairmen of the Hostess Committee. Miss Hoadley, it will be remembered, efficiently planned local trips to hospitals and clinics in addition to points of historical interest in 1936. This year trips will be planned by a committee headed by Margaret McGovern, whose experience with the New York, New Haven, and Hartford Railroad should stand her in good stead. Clinic trips will be handled separately by a special committee headed by Vivian Wecker. Marion Floyd will serve as chairman in charge of arrangements for local exhibits. The 1936 banquet and luncheons provided memorable recipes for famous New England dishes selected by Marie Casteen and her Menu Committee. Miss Casteen will again participate as a member of the Menu Committee, which will be headed this time by Alice Easton. Quindara Oliver Dodge as Hospitality Chairman will welcome visitors to Boston with the assistance of Dr. Helen Mitchell and Reva Singer. Program arrangements are to be under the direction of Beula Becker Marble, who was A. D. A. Secretary in 1936, and Dr. Elda Robb. Local publicity contacts will be made by Elizabeth Caso and Marjorie Cantoni.

In addition to the professional contacts and stimulation which can be expected from the meetings at this forthcoming convention, Boston offers much in the way of "plus values" for the traveler. The Boston Commons, Faneuil Hall, the old North Church and the old State House are but four of the historical sites in Old Boston itself. Also close are Concord, Lexington, and Bunker Hill, and for longer trips preceding and following the convention, there are Plymouth, Marblehead, and Cape Cod which offer attractions for the traveler.

Plans for the program of meetings are already well advanced, and the topics should bid fair to interest all dietitians.[2] Meetings and exhibits will be held at Mechanics Hall. Registration fee for members will be $5, and the rates of recommended hotels may be obtained from the Housing Bureau of the Boston Chamber of Commerce, 80 Federal Street, Boston 10. All reservations should be made through this Bureau. A list of hotels suggested by the Boston Convention Bureau appeared on page 316 of the April issue of the JOURNAL. Begin making plans now to be in Boston for the 31st Annual Meeting of the American Dietetic Association, October 18 through 22.

[1] All trips scheduled before and after meetings.

[2] The tentative program for meetings for the 31st Annual Meeting will be published in the September issue of the JOURNAL.

Current Comment

CONSULTATION SERVICE TO INSTITUTIONS FOR CHILDREN

AGNES B. PETERSON

Nutritionist, Elizabeth McCormick Memorial Fund, Chicago

Dietary consultation service to small institutional homes is a stimulating and rewarding field of work for dietitians and nutritionists. The need for such a service has been demonstrated in the Chicago area by the experience of the Elizabeth McCormick Memorial Fund, an organization whose purpose is to promote the welfare of children. A growing number of requests for assistance led the McCormick Fund a number of years ago to make available to institutions for children an advisory service on dietaries and health programs. From a small beginning, the work has grown to include not only a steadily increasing number of children's homes, but also camps for children and schools having lunch programs. The service is available on request. Many of those consulting us have been referred by other institutions, camps, or schools, or by such agencies as the Council of Social Agencies of Chicago and the State Division of Child Welfare.

Very few of these institutions have trained dietitians. Most of them cannot afford to employ a dietitian or nutritionist, and at the present time there are probably not enough adequately trained persons available to meet the needs. In most small institutions the meals are planned and foods purchased and prepared by men and women who have had practical experience but no specialized training in meal planning and in large quantity buying and cooking. The personnel responsible for the dietaries want their groups to have food that is both adequate for good nutrition and appetizing. Many of them recognize the effect of good food on morale. Their problem is to provide a dietary that will meet these needs at reasonable cost.

The requests for assistance relate most often to evaluation of dietaries; meal planning; the purchase, preparation, and storage of food; and methods for getting children to eat the foods served. The suggestions given depend not only on the requests but also on other needs noted in periodic visits for consultation and observation. To get the feeling of institutional life and to understand some of its problems, we visit the institutions often and learn to know the residents. We eat with the groups and talk informally with both staff members and children. Occasionally it takes several visits to convince the cooks that we are not there to check on them.

Our appraisal of an institutional dietary is usually limited to its nutritional adequacy for the group as a whole. Since it is not practicable to study the food consumption of the individual children, we emphasize the importance of providing appetizing, nutritious meals and careful mealtime supervision of the children so that eating practices can be observed and desirable habits promoted.

In evaluating a dietary we analyze menus, observe food preparation and meal service and learn as much as possible about quantities of food provided. Information is usually available as to the amount of milk ordered daily, the number of eggs used in a week or month, the amount of meat purchased for a meal, and the number of servings of vegetable or fruit obtained from a No. 10 can or from a quart of donated canned food. When it seems advisable to check further on the quantities of food provided, we determine the total amounts of all foods used in a given length of time. These amounts are compared with the food needs of the group for the specified period.

The standards used in evaluating menus are the McCormick Fund's guides for meal planning and suggested meal patterns which include the Basic Seven foods and the "Family Food Plans for Good Nutrition" issued by the Bureau of Human Nutrition and Home Economics of the Department of Agriculture.

The institutions with which we are associated consult us on specific problems that arise from time to time and periodically send us menus to be checked. We provide them with sample menus and guides for meal planning and quantity food buying, and at intervals we send them other timely materials. These relate to such topics as food conservation, use of foods in abundant supply, methods of cooking which best conserve food value, sanitary dishwashing procedure, children's eating habits, and dietary problems frequently met. Bibliographies are available, and special references are often suggested. Staff members are told about the McCormick Fund's

library which includes books and periodicals on all aspects of child care.

Group meetings for informal and frank discussion have been found to be an effective way of gaining interest and cooperation in solving dietary problems. Such conferences may be planned for the staff in a home or for representatives from a number of institutions having common interests. The McCormick Fund nutritionist in charge of the advisory service usually meets with the groups. In some homes the director, house mother, or McCormick Fund nutritionist talks with the boys and girls as a group about dietary needs and problems. In one home where the children refused to drink canned grapefruit juice, the superintendent brought up the subject for discussion by the boys and girls at one of their periodic meetings. The group decided that they could learn to like new foods and agreed to try a little grapefruit juice every time it was served.

An interesting feature of the McCormick Fund's advisory service has been participation in health surveys of institutions. These surveys cover all aspects of the health program, such as the medical, dietary, and recreational programs, and they are made by the McCormick Fund's pediatricians, social workers, nutritionists, and other specialists.

The dietary consultation service of the McCormick Fund has been limited to children's institutions, but our experience in this work has indicated the need for and the value of such assistance to all institutions. Many institutional homes to which advisory service on dietaries is not now available would undoubtedly welcome it. The support for such assistance might come from a public or private agency or from a group of selected institutions that would share the services of a trained worker.

From the personal standpoint, the consultant on institutional dietaries should find the work interesting and stimulating. It includes a variety of activities ranging from checking menus and preparing materials to visiting homes and working with people individually or in groups. The service is new enough to satisfy the pioneering spirit, and the results achieved may be more evident than are possible in many areas of work.

CHILD FEEDING PROBLEMS AND THE SCHOOL LUNCH PROGRAM[1]

E. NEIGE TODHUNTER, PH.D.

Head, Department of Foods and Nutrition, University of Alabama, Tuscaloosa

Child health has improved, but not at the same rate nor in proportion to the increase in knowledge of nutrition. Application still lags far behind knowledge; we are still confronted with malnutrition and, therefore, with the problem of improving the quality of food intake, and in some cases the quantity of food eaten, by the school-age child.

The nutritionist sees the results of poor feeding. Some of these results are being measured by nutritional status studies, but even then, reliable measurements or indices are not readily obtainable and are even more difficult of interpretation. When it comes to feeding problems, there are even fewer measurements, and much of this type of study must lie in the hands of the psychologist and the sociologist.

In discussing the feeding problems of the school-age child, it is, therefore, with considerable hesitancy that I leave the safe anchorage of laboratory and chemical tools and measurements. I would like to present factual material, but there is comparatively little experimental data. I must confine myself to general observations which are fairly well-known and also to some major problems which we have encountered in our work in the search for causes of poor nutritional status of children. These are: (a) irregularity of meals and missed meals, (b) poor food habits and the use of soft drinks and candy, and (c) between-meal eating.

MEALS MISSED

The number of children in various parts of the country who go to school without breakfast is considerable, though no specific figures are available. The number varies with the region and with the socio-economic conditions of the family. Where the mother works, she often does not have time to prepare an adequate breakfast or to see that the children eat before starting to school. It is likely that the housing shortage and the resultant crowded living conditions of families today are contributing factors to meals that are missed. In many homes where more than one family is living, too many persons are using the kitchen at one time, and there is inadequate food preparation space. In rural areas, children frequently travel long distances on school buses, leaving home early and hurriedly without food or only with something to eat out of hand on the way; 30 mi. each way to and from school is not infrequently the distance travelled by such children.

In a small detailed study of children in three rural schools, we have obtained some figures on meals missed. The children in our study are not different from others, so that these data may be considered as indicating something at least of the trend regarding meals not eaten.

Of the group, one-seventh missed breakfast at least once (Table 1) during one week. However, although considerable attention has been directed to the breakfast problem, it now appears that the evening meal may be an even more serious omission. In the group with which we have worked, supper was missed by one-third of the group at least once during the seven-day study period (Table 2).

[1] Presented at the Dietetic Section of the meeting of the American Association for the Advancement of Science in Chicago, on December 30, 1947.

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TABLE 1

Breakfasts missed by rural school children as indicated in seven-day diet records

BOYS	GIRLS	TIMES BREAKFAST WAS OMITTED
32	52	1
13	4	2
1	3	3
0	1	6
1	0	7

TABLE 2

Suppers missed by rural school children as indicated in seven-day diet records

BOYS	GIRLS	TIMES SUPPER WAS OMITTED
82	78	1
29	23	2
15	10	3
5	3	4
4	1	5
1	0	6

In some studies in Tennessee in an industrial group, Ruth Huenemann has reported (1) that breakfast is less neglected than supper. In families observed in their study, breakfast was reported as the one meal of the day likely to be a prepared meal, and supper was frequently missed.

Meals missed and poor nutrition go hand-in-hand and make a vicious circle. The malnourished child has little appetite for food and is more likely to miss meals than is a healthy child.

POOR FOOD HABITS

The child chooses foods which he likes, and his "likes" are those foods with which he is familiar—that is, those foods that he is used to eating at home. The socio-economic background of the family and regional food habits are strong determining factors in what will be served at home and hence in the development of these likes. A child may have limited food experiences because of his home background. Milk is, for many children, an unfamiliar food, and choices of fruits and vegetables are limited. If new foods are to be introduced into the accepted pattern, ways must be found for first presenting the new food, and then for repeating it until it becomes familiar. The school lunch is the obvious answer here.

Soft drinks, candy, and other sweets or carbohydrate-rich foods are a predominant part of the pattern of undesirable food habits. In many schools and school districts, the competition for the child's nickel or dime is very great. The school itself is not free from the charge of competing for the child's nickel to make a profit which is used for other purposes, such as athletic equipment, band uniforms, and instruments. The harmful effects of these food items on teeth and the fact that they crowd out those foods essential for good nutrition have repeatedly been emphasized. On the other hand, it has been demonstrated that the child who receives three adequate meals a day has little desire for sweets and candy.

With the high school girl, the feeding problem is more difficult than for the younger child. We see her in numerous high schools partaking of a soft drink and cigarette at the lunch period instead of eating the regular school lunch because she is "afraid of putting on weight." Lessons in caloric values of food would be of considerable help to these high school girls in understanding how they may obtain essential nutritive value and yet keep calories at a minimum.

The high school boy presents the reverse of this picture. All too often he is being starved because neither his parents nor the school lunch manager recognize his very high demand for calories, and they have no appreciation of the quantity of food that he should eat. The result is fatigue and inability to study and keep up his grades.

BETWEEN-MEAL EATING

The extent to which foods eaten between meals contribute to the total caloric needs of the child and therefore may be desirable and to what extent this between-meal eating takes away the appetite for essential foods at meal times have yet to be investigated. Recent studies have shown that milk taken 1 hr. before the regular meal in no way detracted from appetite or lessened the amount of food eaten at meal time. However, the effect of between-meal eating of candy and other carbohydrates has not been studied in the same careful manner.

Some studies on between-meal eating, its extent, and causes for high school boys and girls is now under way in our laboratory. Some preliminary studies on a slightly older age group showed a high prevalence of between-meal eating. The reasons most frequently given as to why additional food or beverage was taken between meals are listed in Table 3.

TABLE 3

Reasons given most frequently for between-meal eating as indicated on seven-day diet records for 153 college students

REASON	TIMES STATED
Habit	18
Missed a meal	34
Hungry	133
Sociability	134
Something to do	55
Like it	19

Thus, in brief, the major feeding problems in the school-age child that we have met are: (a) meals missed, (b) poor food habits, and (c) between-meal

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eating. Where does the solution lie? The school lunch program is believed to provide at least part of the answer, *if* the school lunch can be made a means of teaching good nutrition.

THE SCHOOL LUNCH PROGRAM

On a national scale school-feeding was much slower in being introduced in this country than abroad, but the depression gave cause for increasing interest in the problem. Federal aid for school lunch feeding was begun in 1933 and, as part of the Works Progress Administration, the WPA school lunch program was initiated as a means of providing employment. In this period, also, there was the problem of agricultural surpluses. In order to aid the farmers, the federal government purchased quantities of food and distributed them to school lunch programs. By 1943, food surpluses had disappeared, and the WPA was also abolished. However, by this time, many dietary studies and nutrition surveys had been carried out, and attention was directed to the incidence of malnutrition among children, as well as among adults. The National School Lunch Act passed in June, 1946, gave a more permanent basis to federal aid for school lunches. However, in many instances today, the school lunch is considered only as a service to provide food for children who do not have time to go home for lunch. It must fulfil a greater function than this.

The school lunch offers a means of improving health and nutrition. Through it, the child has an opportunity to learn to know and to like new foods and a wider variety of foods, and simultaneously to develop desirable food habits. Other learning experiences in cleanliness and health habits, table manners, conversation, and social behavior may be acquired in the natural situation of eating lunch. Also, various subjects which are taught in the classroom can be given real significance when related to the food and other experiences associated with the preparation and eating of lunch at school. This new relation of the school lunch to the education of the child can be indicated by a diagram (Fig. 1).

Nutritional studies showing that physical development of the child is dependent on food are familiar

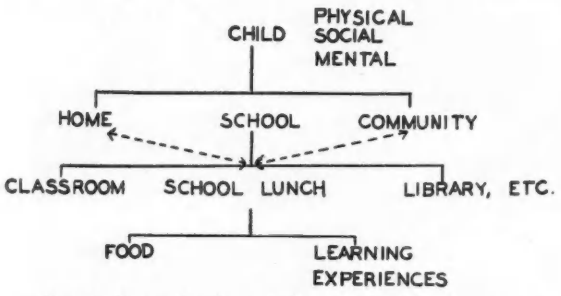

FIG. 1. *Chart showing relation of school lunch program to overall educational program.*

to all dietitians, and the relation of social development to physical well-being is also well established. Ruth Harrell's studies (2) are typical of those now being made which show a relationship between learning ability and food.

If we are to improve food habits and gain good nutrition for all children, the school must recognize its reponsibility for making the school lunch not a service feature but an integral part of the educational program. Through the schools, it is possible to reach larger groups than in any other way. Children are more adaptable and more willing to learn and to acquire new habits than their parents, and there is also the possibility that children may carry back into the home some of the interest in new foods, new ways of preparing food, and new knowledge of nutrition in relation to health.

IMPROVING NUTRITIONAL STATUS THROUGH THE SCHOOL LUNCH

The contribution of the school lunch to improvement of nutritional status has been shown in studies carried out in Louisiana, South Carolina, Florida, and Pennsylvania, and further studies on this problem are now in progress in North Carolina and at the Universities of Toronto and Alabama.

Moser (3) observed the growth and nutritional condition of children in two rural elementary schools in the Upper Piedmont of South Carolina for a period of sixteen months. The majority of the children were short for their age when compared with children in a nearby college community and with American children of a large scale study. The South Carolina children also had lower hemoglobin levels. During the winter sessions, one school served a complete hot lunch and the other served a partial lunch made up of foods that could be served without cooking. At the end of the test-feeding period, more of the children in the group receiving the complete school lunch showed the following advantages: (a) more physical signs of good nutrition; (b) improvement in trend of physical growth and development (also fewer in the group lost ground during the period of study); and (c) higher hemoglobin levels. The group receiving a partial lunch had lower hemoglobin values at the close of the study.

In a study carried on in Florida (4) for a five-year period beginning September, 1940, the effectiveness of the school lunch in improving nutritional status of rural school children was measured. The children were given a physical examination, hemoglobin and red blood cell counts were made, and height and weight were determined three times during the study. The lunch which was provided daily supplied one-half or more of the recommended allowance for each nutrient. At the end of the fourth year of the study, there was a marked decrease in the number of children with clinical signs of nutritional deficiency. There was an increase in the hemoglobin values during the

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school year and a decrease during the vacation period. Height and weight measurements charted on the Wetzel grid showed a shift in channels toward better physique and a definite advance in the developmental level. The authors of the study concluded that when adequate lunches are prepared under trained supervisors, such lunches offer an effective means of raising the nutritional status of school children.

NEED FOR NUTRITION EDUCATION

But lunch at school is not enough. Supplying of food alone does not bring permanent benefits to the child. This has been shown in our own observations on children. When children were being weighed at school last fall, some had not gained or had lost weight since being weighed the preceding spring. These children remarked, "Oh, it is all right; I will gain it back now that I can eat lunch at school." Also, in the Florida studies by Abbott (4), the hemoglobin values of school children were found to decrease during vacation.

Food is not enough. Education must accompany the feeding program so that the food practices of the child will continue to be sound when he is away from school.

Pennsylvania studies (5) offer further evidence on this point. In a nine-year study of the school lunch, Mack and co-workers made measurements of nutritional status. The measurements included medical and dental examinations and blood, urine, and saliva tests. At the end of the period, it was concluded that the only children showing marked improvement in many of the tests were those whose school feeding regimen met the following conditions: (a) someone who understood how to make dietary calculations planned the lunch, and (b) some way was provided to ascertain the nature of the child's home meals, so that the school lunch could compensate properly for the weaknesses of the food intake at home.

An educational program for the child must also be accompanied by better training of those responsible for the planning and serving of the school lunch so that it makes an appreciable contribution to the child's nutritional needs.

In the Florida study, when an untrained person took over the preparation of the lunch and certain foods were difficult to obtain, children who had previously shown a rise in hemoglobin values showed a drop for that year.

In studies at the University of Alabama we have found many children do not have fruit for breakfast, and thus the school lunch must be relied on for the major portion of the needed daily supply of ascorbic acid. A sampling of schools and analyses of lunches for their ascorbic acid content showed that many lunches were inadequate (6). Food was collected from seven city schools and two county schools on four consecutive days in each school during February and March and again in April and May; thus, late winter and spring food supplies were represented. Plates of food as served to the children were taken to the laboratory and immediately analyzed for ascorbic acid, both in the reduced and dehydro form. In all, 212 plates of food were analyzed. The average of all plate lunches was 30.76 mg. of ascorbic acid per lunch, and the range was from 9.27 to 40.18 mg. Only three of the nine schools served lunches with a daily ascorbic acid content equal to one-third of the National Research Council's recommended allowance for school-age children. Yet the school lunch was probably the only source of this vitamin. If we believe that the National Research Council's figures are too high and that 30 mg. might be enough, these children were still on the borderline of needed ascorbic acid.

At present we have little information as to how best to teach nutrition in schools or how to use the school lunch as a basis of such teaching. Studies, such as that of the Indiana workshop in 1944 (7), the Central Washington College workshop in 1945 (8), the work of Willa Tinsley in Texas (9), and Eugenia Whitehead in Louisiana (10), begin to point the way to what can be accomplished.

SUMMARY

Evidence has been presented that our present knowledge of nutrition and food values far exceeds the application of this knowledge with consequent malnutrition among children. Evidence has also been presented that when the food intake of children is improved in quality and quantity, measurable improvement in nutritional status has been demonstrated. But more than feeding is needed for permanent benefits to the child. Education must go hand-in-hand with food. The school lunch as an integral part of the educational program is believed to be one means of solving problems of malnutrition.

Some goals which must be attained if the school lunch is to contribute to the nutritional well-being of the child are presented here for consideration and study. These goals are expressed concisely.

(a) Educators and school administrators must understand the importance of nutrition for school children and recognize the value of the school lunch in nutrition education.

(b) The school lunch must be a part of the total school program. Teachers need to have training which will provide sufficient background in nutrition to be able to give children adequate guidance in food selection and the development of desirable food habits.

(c) The school lunch program must be managed by trained lunch managers, assisted by employees who have been given adequate training for their specific jobs.

(d) The school lunch must be eaten by "trained" children—that is, children who are learning about

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foods in relation to nutrition and health and who recognize the school lunchroom as a laboratory for educational experiences.

(e) The school lunch program must run on a non-profit basis, financed in the same way that other school services are financed. The sale of non-essential foods and beverages at lunch times or at any other period of the school day should not be permitted.

(f) There must be further research and study of the nutritional needs of children, of ways of developing new food habits, and of how to teach nutrition to boys and girls so that they will put into practice what they are taught.

(g) Nutritionists, dietitians, public health workers, and health educators must be alert to the significance of the school lunch as a contribution to the nutritional well-being of the child and must direct their efforts to the fulfillment of such a program as has been described.

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FOOD PREFERENCES OF YOUNG CHILDREN[1]

MIRIAM E. LOWENBERG, PH.D.

Nutritional Supervisor, Rochester Child Health Project, Rochester, Minnesota

When Junior refuses food, it may not always be due to psychological causes. Many times when Junior doesn't eat his spinach, the spinach and only the spinach should receive the blame. There is no reason why a young child should learn to eat stringy spinach. The thing to do is to change the spinach, not the child.

A number of years ago when I timidly entered the field, I was in charge of feeding a group of young children in a nursery school. I think it was my own timidity at first that made me blame the food when the children refused to eat. I was quite sure that either I or the student cooks under me had done something wrong, so I began to look at the food critically—its flavor, its texture, and its temperature. The whole menu came under scrutiny; perhaps the combination of foods was wrong.

I had very few guideposts to follow in those days. We thought that all children *must* drink a quart of milk a day, but the little rebels were about to win their war against the mothers of the nation. In truth, the mothers really were on the run. You can imagine how intrepidly I approached a group of young children who must eat in a model way so that I could teach the college students how to wage this war successfully when they had Johnnies and Marys of their own. I began watching the children's reactions to all of our foods. The supervisor in the nursery school was a very wise woman. Though I often wanted to leave before the children had finished eating, she insisted that I stay and see the entire problem through, even to watching the dawdlers. I often learned a good lesson at three minutes to one o'clock. Later, during the war, at the Kaiser Child Service Centers we required the cooks to go into the children's dining rooms to watch them eat. First of all, it was a treat to the cooks—a rewarding experience to see the children appreciating their (the cooks') laborious efforts. Then, too, the cooks themselves could see the struggles with such things as tough skins on baked apples.

After watching young children eat over a period of sixteen years, I can tell you a few things children do and do not like. These are the "trade secrets," as it were, or, as one of my student cooks once said, "tricks up your sleeve."

TEXTURE OF FOOD

Texture of food is mighty important to the youthful diner. One day, early in my experience, practically to a man, our nursery school children refused to eat our Norwegian prune pudding. The head teacher asked me never to serve it again, and I took the easy way, serving just plain prunes thereafter. I found that the children liked these very much. I had at least one lead as to what they did like—plain and unmixed foods.

Later I noticed one little boy put his spoon into a dish of pudding, and the entire sauce-dishful of the gummy mass came up with the spoon. I knew, as any cook knows, that something was wrong; no starchy pudding need have a texture like that. That very day, I reduced the quantity of starchy thickening agent in every pudding by exactly one half. It

[1] Presented at the Dietetic Section of the meeting of the American Association for the Advancement of Science in Chicago, on December 30, 1947.

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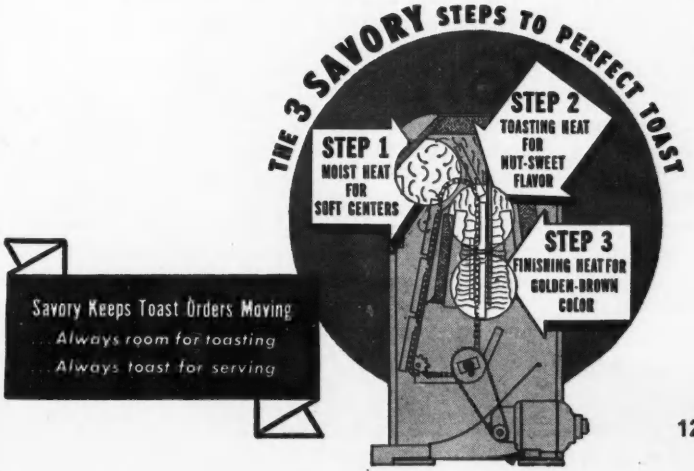
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A child wants his starchy food, such as mashed potatoes, soft and fluffy. He eats his food when it's lukewarm in temperature. Thus his mashed potatoes must be soft and not gummy at that temperature. There will be more about temperature later.

Young children have a terrific struggle to swallow anything which is the least bit dry. Dry flakes of fish are about the worst thing they encounter. This problem almost had me baffled. I tried fish as fish chowder, and the children strained the fish flakes out with their teeth and drank the milk. Then I tried baking fish, covering each piece with a good tomato sauce. But the children were too adept at eating every mouthful of sauce and leaving the dry fish. Finally, I made a soufflé of the fish, with the fish flakes firmly bound in a white sauce and custard mixture. Over a twelve-year period in the Iowa State College Nursery School, the children liked this dish very much, and it was also very popular with a large number of children at the Kaiser Child Service Centers. In fact, this is the only recipe for which any child ever asked me!

With no group of patrons is it more important than with children to keep the cooking temperature low enough so that the proteins will be toughened as little as possible. Meats are often poorly eaten by young children because they are too dry, granular, or tough.

Young children have great difficulty managing the mechanics of eating if we hold adult standards for them. We should remember that when an eighteen-month-old is investigating a new food, he often wants to feel it as well as taste it. By letting children handle a food, I've found that a poor eater makes an initial approach to a food which leads him to taste it and to learn to like it. Young children really prefer so-called "finger foods." I never put lettuce under a young child's salad. He much prefers a wedge of crisp cabbage to a cabbage salad. Raw cabbage, in fact, is a popular food with young children, but cabbage salad is usually rather unpopular. Cottage cheese and lettuce should be served as separate foods. Creamed foods should not be put on pieces of toast, but bite-size cubes of toast can be mixed with a creamed meat dish. Strips of toast served separately are even easier for a young child to handle.

I have also learned that to cut meat into bite-size pieces is beyond the ability of most children up to the age of six years. One authority says that you must not expect this performance before the age of ten years. However, a number of six- and seven-year-olds at the Kaiser Child Service Centers wanted slices of meat instead of "baby's" meat. I use ground meat dishes for young children, however, for the most part. I think it is very important that young children eat a good serving of meat, and I know that most children won't if they must cut or chew it laboriously.

CHILDREN DISLIKE STRONG FLAVORS

Flavor is very important to the young child, too. When David refuses cabbage, you often do not need to look into the psychological causes for his action. He perhaps has more sensitive taste buds than you or I, and the flavor of the cabbage, for instance, may be unbearably strong to him. Even for adults, many pleasant odors become obnoxious in strong concentrations, and a child's sense of smell is very acute. The taste and odor overwhelm him.

I know that this is true because I experimented with creamed onions, trying to make them a popular dish with young children. At last I learned how to prepare them so that the children would ask for second helpings. I covered the onions for cooking with a great excess of water, repeating this process twice or until the onions had a very mild flavor. When the onions were cooked so that they still had a bit of crispness left and were covered with a cream sauce, the children liked them, even though adults might call them insipid in flavor.

The objection, of course, to this method is that water-soluble nutrients, for the most part, are lost. But, what difference does it make how much of the nutritive value we save if the children won't eat the vegetables? Isn't it wiser to teach a child to like cabbage, cauliflower, broccoli, and onions, and then after they have learned to like the mild flavor to help them later to like a strong flavor? Apparently individuals, as they grow older, actually do learn to like strong flavor in food. Perhaps, as we take more seasoning in our food, we dull our sense of taste. The researches of Pratt, Nelson, and Sun (1) showed that young infants reacted against increasing strength of solutions. I have observed this to be true over and over with young children. In my experience, apricots, mildly sweet and covered with a mild custard sauce, have always proved more popular with the children than have dried apricots served alone.

CHILDREN WANT FOOD LUKEWARM

Temperature is also an important factor in the acceptability of food on the part of young children. They usually like their food lukewarm. You will see evidence of this if you will watch children waiting until hot potatoes have cooled or stirring ice cream until it becomes softer and warmer. Sometimes, of course, children lose patience with food very quickly and do not wait for it to cool. When we serve food to large numbers of children, this fact is in our favor. At first I was distressed because we couldn't buy heated food carts for the Kaiser Child Service Centers. This did not, however, prove to be a disadvantage. Instead, the cooling of foods that occurred from the time they left the kitchen until they were eaten was actually an advantage.

I have observed large numbers of eighteen-month and two-year-old children turning down ice cold

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milk but drinking the milk willingly when it was served to them lukewarm. However, four- and five-year-olds, as I have observed them, prefer cold milk.

CHILDREN NEED EASY-TO-HANDLE EATING UTENSILS

The kind of dishes and eating utensils which are supplied is another important factor in the successful feeding of young children. Flat soup bowls or plates with curved edges are best for the younger child whose fingers are too chubby and awkward to be extremely skillful in lifting pieces of food on a spoon or fork. Glasses which are low and squat and light in weight are best for milk. I prefer to serve the young child 4 oz. of milk at a time—4 oz. with his dinner and the other 4 oz. with his dessert. Eight oz. in one glass is really too much for a two-year-old to manage. He is also somewhat overcome by so high a goal. We have learned something else in the nursery school which can be applied in hospital food service for children. We like to use individual pitchers from which the two- or three-year-old, as well as his four- or five-year-old brother can pour his own milk.

Short, blunt-tined forks with broad, short handles fit a child's small hands well and are most suitable for his purposes. Spoons which are shovel-shaped with shallow bowls are most suitable also. Salad forks can be used it you don't have special children's forks.

I think small children should be allowed to drink their soup from a cup. If you watch a two- or three-year-old child spoon and spill his soup and finally lose all of his patience, you, too, will be driven to serving it in a cup. A young child's lack of skill in using the small muscles of the hand make it difficult for him to eat without spills, and we should expect this.

GROUP FEEDING

I should also like to make a plea that anyone who feeds children—young or old—watch these children eat with a special eye to making the mealtime a happy time for the children. I have often wondered whether it would not be possible to serve together at small tables at least the children who are ambulatory in a hospital. Psychologically, this is good. Children in groups usually eat better. Some children in wheel chairs eat more happily when the wheel chair is pushed up to a table. Then, too, nurses could save time and energy in supervising the children's eating.

Children greatly appreciate the opportunity to make a choice of foods, as was shown by Dr. Clara Davis' experiments at Children's Memorial Hospital, Chicago. She arranged to have the food carts wheeled around, and the children were asked what they wanted. Food waste was reduced remarkably, and the children were much happier, too.

SUMMARY

I don't know of any effort that is more rewarding in feeding children than trying to adapt the food to the capacities and preferences of the subjects. I am convinced that children don't hate all vegetables. They do, however, rebel against certain textures and flavors of some vegetables. It must also be remembered that children are more frank in expressing their likes and dislikes than adults. This really makes feeding them more rewarding and less baffling than feeding adults. We must, however, try to see the food from the child's point of view.

Sometimes I think we, as nutritionists and dietitians, could use greater variety in menu making. Good frankfurters and good beef hamburgers can be good food for a young child. The quality and not the type of food determines this. Except for the quantities of sirup which may be used, pancakes can be good food for children.

Finally, the core of the whole matter is that we must consider the child when we feed him if we are to be successful in influencing him to eat the right foods happily.

Army Urgently Needs Dietitians

Following are excerpts from a letter from the Surgeon General of the Army received by Gladys E. Hall, Executive Secretary of A.D.A. The letter speaks for itself, concerning the present urgent need for dietitians by the Army.

Dear Miss Hall:

This letter is to acquaint you with the need for dietitians in the Medical Department of the Army. During the active days of the war, there were approximately 2000 dietitians on duty in Army Hospitals. There are presently only 220.

The President's message to Congress has brought home to us once again the great need for keeping our personnel up to strength. Even without plans for expansion, the Dietitian Section of the Women's Medical Specialist Corps is short approximately 100 dietitians. It is essential that this number be secured immediately. If the present Congress enacts laws for Selective Service or Universal Military Training, it will be necessary to obtain additional dietitians, the number depending upon the strength of the Army.

Sincerely yours,
(Signed) R. W. Bliss
Major General
The Surgeon General

All types of foods should be carefully prepared, and the importance of proper preparation of canned foods is recognized in relationship to flavor, texture, appearance and nutritive value.

Research on nutritive content resulting from two methods of home preparation of canned foods, and on desirable methods for large-scale food preparation has been conducted and reported.*

Two methods for preparing canned vegetables in the home were used in the studies. (1) The liquid was drained from the vegetable and reduced by boiling to from one-third or one-fourth its original volume. The drained vegetable was added and heated. (The concentrated liquid adheres to the vegetable and is eaten with it.) (2) The entire content of the can (both vegetable and liquid) was heated together and the liquid drained off before serving.

Experiments were conducted to see what effect heating on a steam table in quantity food service had upon vitamin retention.

HOME PREPARATION: There was some *ascorbic acid* loss in either method, but it was much greater when the liquid was discarded. There was no *thiamine* or *riboflavin* loss through destruction in boiling down the liquid, but there was a 30-40% loss when the liquid was discarded.

Some of the *mineral* content was found in the liquid portion of the can. Less mature vegetables had more *carbohydrate* content in the liquid than the more mature ones. The higher sugar content of the less mature vegetables is more soluble than the higher starch content of more mature vegetables.

LARGE-SCALE PREPARATION: Results of study on quantity food preparation correlated the Small-Scale (home) Preparation for vitamin retention. Additional *ascorbic acid* was lost as the food stood an hour and a half on the steam table. Two exceptions, asparagus and tomatoes, were noted; there being no definite destruction in either vegetable after a half hour of boiling and an hour and a half on the steam table.

RECOMMENDATIONS: *Use the Liquid from Canned Foods. Do not over-cook.* For home-preparation the method discussed under (1) is recommended. For institutional food service preparation in small quantities and immediate use, or short steam table holdings, are best. If liquid is not served with the food it should be used in other ways.

**Research sponsored by the National Canners Association and the Can Manufacturers' Institute.*

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For further information about preparation of canned foods, for table giving vitamin content of canned foods and a table giving servings of canned food per unit, write to:

HOME ECONOMICS DIVISION, NATIONAL CANNERS ASSOCIATION
1739 H Street, N. W., Washington 6, D. C.

Book Reviews

Old World Foods for New World Families. By Lelia McGuire. Detroit: Wayne University Press, 1947. Paper, spiral bound. Pp. 112. Price $2.

The first edition of this book was published in 1931 by the Merrill Palmer Motherhood and Home Training School at the request of home economics teachers, social workers, and persons interested in work with foreign groups. The author has now revised and broadened the scope of the original book so that an interchange of food habits and customs should be fostered, bringing about a greater understanding and friendliness among both foreign and native groups.

The material used in this book grew out of work with foreign born women at Merrill Palmer School. Women from the various nationality groups were invited to come to the school to prepare and discuss the meals which characterize their country. By these demonstrations and from these classes in which ideas were exchanged, all gained a better understanding of other groups and were able to adjust to American food habits.

Menus, recipes, typical foods used, and the method of preparation of the recipes are given for sixteen nations. This information should be useful to social workers, dietitians in food clinics, nurses, teachers, visiting housekeepers, and any other people who work with various nationality groups.

The understanding and thoughtfulness of people, as well as the excellent teaching ability of the author, are evident throughout the book. In addition, beautiful block prints have been used to illustrate each chapter, and the typographical design and format are extremely pleasing and attractive.—*Dr. Helen A. Hunscher, Head, Department of Home Economics, Western Reserve University, Cleveland.*

Hawaii Diet Manual. By Diet Therapy Committee of the Hawaii Dietetic Association. Honolulu: Hawaii Dietetic Association, 1947. Paper. Pp. 192. Price $5.

In the foreword, the Committee comments on the need for using a standard diet procedure for the hospitals and physicians of the Territory. Members of the Committee, representing Queen's, St. Francis, Kuakini, and Kapiolani Hospitals and the University of Hawaii, compiled this manual, and it has been approved by the Honolulu County Medical Society and the Territorial Medical Society.

In addition to the diets, the *Manual* includes instructions for vegetable cookery and a list of good food sources of vitamins.

Special emphasis has been placed on the use of island foods and the adaptation of the diets to the varied racial food habits, including Caucasian, Japanese, Filipino, Hawaiian, and Chinese. Food lists for diabetic patients are written in Chinese and Japanese, as well as in English. Although there is a predominance of foods familiar to us on the Mainland, the suggested menus incorporate several island foods. For example, papaya and guava juice are generally used in place of our citrus fruits and juices, and poi, taro, and tofu (soy bean curd) are often used as a starchy vegetable.

Although prepared for use in the Territory, the *Manual* could be adapted for use in this country and in other regions where similar racial groups live.—*Betty Whitacre Hunter, Chicago, Illinois.*

Food Enough for All. By Constantin Paul Lent. New York: Pen-Ink Publishing Co., 1947. Cloth. Pp. 120. Price $3.50.

All thinking citizens decry food profiteering and speculation, and all nutritionists agree on the fundamental importance of food and the desire for good nutrition for all. However, whether the scheme outlined by the author is the means to eliminate food profiteering and provide good nutrition for everyone is an open question. It seems likely that the evils which would surely arise from the author's plan would be as serious as those in our present system.

Mr. Lent advocates that food should "become a public utility and the men that grow it, such as farmers, cattlemen, dairymen, and the like, should be government servants, maintained by the usual forms of taxation." He then goes on to outline the tax system and rate of taxation for each individual. He claims that nothing else will work and that if we will only feed people, we will solve all problems. History fails to support such statements.

Dogmatic statements are made throughout, and there are frequent contradictions, such as "Use of atomic bombs in future wars will not affect the progress of civilization as such any more than any other inventions have heretofore affected its progress," followed by the final statement, "Food for all, or atomic destruction for all."

The author is undoubtedly sincere in his thinking that a plan such as he proposes will solve our food problems. Any presentation that seeks to provide food for all people merits careful consideration; this book should be read thoughtfully and critically.—*Dr. E. Neige Todhunter, Head, Department of Foods and Nutrition, University of Alabama, Tuscaloosa.*

The Pathology of Nutritional Disease. By Richard H. Follis, Jr., M.D. Springfield, Ill.: Charles C. Thomas, 1948. Cloth. Pp. 291. Price $6.75.

This book presents the pathological effects that occur in mammalia when there are deficiencies of the essential elements—the essential amino acids, the fat- and water-soluble vitamins, and the essential fatty acids. In addition, there is a short historical introduction and presentation of biochemical relationships for each essential nutrient.

The last section of the book, which deals with the pathologic anatomy of specific tissues, is a reorganization of material presented in the previous sections to bring out comparisons of pathological effects of deficiencies of the various nutrients on specific tissues and tissue systems.

The author, who was formerly Associate Professor of Pathology at Duke University and now holds the same position at Johns Hopkins Medical School, has done a fine job in the organization and presentation of the subject matter. The many excellent photographs and the larger number of bibliographical references make this book a valuable tool to the therapeutic dietitian, nutritionist, and biochemist as well as the pathologist.—*Dr. Dorothy Ann Ehmke, School of Home Economics, University of Alabama, Tuscaloosa.*

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Current Literature

Contributed by Janette C. Carlsen and Ethel M. Miller, Dietary Department, The Johns Hopkins Hospital; Lorraine G. Weng, University of Chicago Clinics; Mrs. Quindara Oliver Dodge, Women's Educational and Industrial Union, Boston; Mrs. Corinne Robinson, Temple University School of Medicine, Philadelphia; and the Journal staff.

AMERICAN JOURNAL OF DISEASES OF CHILDREN

Vol. 74, December, 1947

*Relation of lesions of the tongue in children to niacin deficiency. H. Bakwin, H. S. Reardon, J. S. Winn, M. S. Tenbrinck, M. L. Stern, and M. G. Engel.—p. 657.

*Serum iron levels in adolescent girls. F. A. Johnston.—p. 716.

Tongue Lesions and Niacin Deficiency. Lesions of the tongue, are common in children. Sixty children with four types of tongue lesions were observed: acute glossitis, glossitis migrans or geographic tongue, mild swelling of the tongue, and fissures of the tongue. The diets of these children were not demonstrably different from the diets of children without such changes. Eight to 20 mg. nicotinamide per kilogram of body weight were given daily for several months to some patients whereas others received no therapy. Patients with swollen and fissured tongues who were treated with niacin showed greater improvement than was observed among patients who received no therapy. Cure was never complete, even though the average duration of therapy was fifteen months. There was no response in less than three months. Glossitis migrans was unaffected by therapy, while acute glossitis improved spontaneously or after chemotherapy. Niacin appears to have a favorable influence on the nutrition of the tongue, but there was no evidence that the lesions were due to niacin deficiency.

Serum Iron. Hemoglobin levels, red cell volumes, and red cell counts were determined on three adolescent girls over a period of five months. Although these values were within the average range, the serum iron levels were low and differed among the three subjects. This variation suggested the possibility that serum iron may respond more rapidly to changes in iron stores than does the hemoglobin content, the cell count, or the cell volume. It was found that the serum iron of the three subjects did not decrease on an intake of 4 to 5 mg. of iron for nine weeks, or rise on an intake of 9 to 11 mg. for eleven weeks. Serum iron does not respond rapidly enough to be used as a criterion for studies of iron requirement which are of a few weeks duration.

ANALYTICAL CHEMISTRY

Vol. 20, January, 1948

Chemical determination of tryptophan. J. R. Spies and D. C. Chambers.—p. 30.

Determining small amounts of calcium in plant materials. E. H. Tyner.—p. 76.

*Microbiological assay for riboflavin. H. A. Kornberg, R. S. Langdon, and V. H. Cheldelin.—p. 81.

Determination of Riboflavin. A number of difficulties have been encountered in the application of both of the generally used methods for the determination of riboflavin. These two methods are the *L. casei* assay and the fluorometric method. In this paper an assay for riboflavin is presented which uses *Leuconostoc mesenteroides*. This method is sensitive to 0.0001 mcg. of the vitamin per cubic centimeter. The higher sensitivity of this microorganism permits preparation of samples for assay with greater dilution than has been possible before. The advantage of using dilute extracts is that decreased amounts of extraneous matter are present in the assay tubes. Results obtained by this method have been found to be satisfactory.

BRITISH MEDICAL JOURNAL

No. 4544, February 7, 1948

*Chronic hepatitis treated with methionine and choline. D. G. Cameron and M. L. Newhouse.—p. 253.

Treatment of Chronic Hepatitis. Six patients suffering from chronic hepatitis were treated with a high-protein diet (120 to 150 gm. protein) supplemented with 15 gm. of methionine daily for six weeks. Choline chloride was given in the same amount for a further period of three months. Changes in the clinical condition of the patients during this time, and variations in the plasma protein did not seem to be related to treatment.

CANADIAN MEDICAL ASSOCIATION JOURNAL

Vol. 58, February, 1948

*Haemoglobin levels among Saskatchewan college women. W. W. Hawkins, J. Barsky, and H. B. Collier.—p. 161.

Hemoglobin Levels of College Woman. An examination of hemoglobin levels in 352 healthy University of Saskatchewan women students between the ages of seventeen and twenty-six years showed a range of 11.1 to 16.4 gm. per 100 cc. of blood. This value is slightly higher than most of those reported on comparable groups elsewhere. Examination of the literature supplies no evidence that altitudes up to 2600 ft. have a significant effect upon the hemoglobin level.

INDUSTRIAL AND ENGINEERING CHEMISTRY

Vol. 40, March, 1948

*Vitamin B content of sugar beets and by-products. D. Rogers and M. N. Mickelson.—p. 527.

Vitamin B in Sugar Beets. This article includes a description of the by-products of the sugar beet which have been analyzed for thiamine, riboflavin, niacin, pantothenic acid, biotin, pyridoxine, and folic acid. In general, the B-complex was found in greater amounts in the stalks and leaves of the sugar beet plant than in the beet tissue. However, the beet tissue and crowns had a greater thiamine content than the stalks, and the crowns were richer than the stalks in niacin and pantothenic acid. The crowns were also richer in B-complex vitamins than the lower part of the beet. The seed chaff was higher in folic acid than any of the

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other materials examined. Beet molasses compared favorably with high test molasses (cane invert sirup) but was lower than blackstrap molasses in the B-complex except for niacin and folic acid.

THE JOURNAL OF BIOLOGICAL CHEMISTRY

Vol. 172, February, 1948

Further studies on the metabolism of tryptophan and nicotinic acid by the rat and other animals. B. S. Schweigert and P. B. Pearson.—p. 485.

*A chemical method of estimation of nicotinic acid in urine in the presence of sugar. S. Banerjee, N. C. Ghosh, and G. Bhattacharya.—p. 495.

Urinary excretion of amino acids by human subjects on normal diets. H. W. Woodson, S. W. Hier, J. D. Solomon, and O. Bergeim.—p. 613.

*The enzymatic extraction of riboflavin from pork for the fluorometric determination. B. M. Watts, D. H. Peng, and N. C. Esselbaugh.—p. 707.

Niacin Excretion in Diabetics. It has been shown that intravenous injection of niacin produces hypoglycemia in normal humans and improves the carbohydrate tolerance of diabetic patients. For this reason a study was made of the urinary excretion of niacin in persons with diabetes mellitus. Because the commonly used methods for the chemical estimation of niacin were unsatisfactory in tests on urine containing sugar, a new method is presented in this paper. Application of this method in the case of eight diabetic patients indicated that the urinary excretion of niacin was approximately the same as for healthy individuals. There is evidently no interference in the niacin nutrition of diabetic patients.

Riboflavin in Pork. Apparent increases in riboflavin content have been observed when various raw foods have been cooked or processed. Such results have been obtained by either microbiological or fluorometric procedures. There is a possibility of a riboflavin combination in tissues which is only partly released by commercial enzyme preparations acting on heat-denatured tissues. However, this riboflavin combination may be released by enzymes within the tissue itself. To test this hypothesis, a study has been made comparing riboflavin values obtained on raw pork by means of a fluorometric procedure with values obtained on the same pork after a preliminary autodigestion. This experiment suggests that incomplete extraction of potentially active riboflavin may account for reported increased yields after processing or storage. It seems that more work on extraction procedures is imperative before reliance can be placed on figures for the riboflavin content of meats or riboflavin losses during meat processing.

JOURNAL OF THE INDIAN MEDICAL ASSOCIATION

Vol. 16, July, 1947

*The relation between infantile cirrhosis of the liver and a diet of polished rice. A. E. Sundareson.—p. 335.

*Congenital vitamin deficiency. M. L. Kundu.—p. 350.

Vol. 16, August, 1947

*Some physiological problems in tropical life. M. N. Rao.—p. 375.

Infantile Cirrhosis of the Liver. Consideration of the incidence of cirrhosis of the liver in its relation to the diet in different parts of India has resulted in the recognition of the relationship of this disease to a rice diet. The experiment reported here was undertaken to observe the effect of the mother's diet on the liver of sucklings. Twelve albino rats with total litter of forty-eight young were the subjects of this experiment. The diets of the mothers consisted of polished rice and vitamins supplemented with yeast, meat, or casein. Injections of carbon tetrachloride, a cirrhogenic poison, were also administered. The results showed that the young, whose mothers' diets were partially deprived of either yeast or meat, exhibited extensive necrosis and hydropic degeneration in the liver and a striking retardation of growth. The greater the amount of yeast, meat, or casein in the mothers' diets, the less the degenerative changes observed in the offspring. Casein had the least protective action.

Congenital Vitamin Deficiency. A deficiency disease is described here which shows the signs and symptoms of both rickets and celiac disease but which does not conform to the typical description of either. The disease, according to the author, is often found in children whose mothers have had too frequent pregnancies. These children are usually deprived of mother's milk at an early age and given various patent foods of a carbohydrate nature. The author suggests that the disease is a congenital vitamin deficiency in which the mother, because of frequent pregnancies, has suffered from minor vitamin deficiencies, especially of the A and D group. The offspring have shared in these deficiencies in fetal life. Treatment involves vitamin supplements to the baby and the mother. Both should receive a high-protein, low-carbohydrate diet, and breast feeding should be emphasized. Prevention of the condition through education is stressed.

Diet in the Tropics. Diet in the tropics is discussed as one of the physiological problems in tropical life. It is stated that although a man's caloric requirement may be less in the tropics because of his depressed metabolic rate, the basic requirements of other dietary essentials is the same as in temperate climates. Although protein has a high specific dynamic action, an intake of from 75 to 150 gm. daily may be taken "without effect on the performance of intermittent work in the heat." It has also been observed that the body conserves the water-soluble vitamins in the excessive water loss from the body during thermal sweating. The real problem, however, seems to concern the preservation of protective foods in the tropics. Because of accelerated endogenous enzymatic activity, the distribution of some foods, such as milk and eggs, is restricted to the communities near the source of production. This is a serious handicap to the nutrition worker in the field.

THE JOURNAL OF NUTRITION

Vol. 35, February, 1948

*Supplemental value of certain amino acids for beef protein. R. Hoagland, N. R. Ellis, O. G. Hankins, and G. G. Snider.—p. 767.

*The isoleucine requirement of the infant. A. A. Albanese, L. E. Holt, Jr., V. I. Davis, S. E. Snyderman, M. Lein, and E. M. Smetak.—p. 177.

The role of vitamin D in the utilization of phytin phosphorus. R. R. Spitzer, G. Maruyama, L. Michaud, and P. H. Phillips.—p. 185.

*Availability of riboflavin of ice cream, peas, and almonds judged by urinary excretion of the vitamin by women subjects. G. Everson, E. Wheeler, H. Walker, and W. J. Caulfield.—p. 209.

*Comparison of vitamin A liver storage following administration of vitamin A in oily and aqueous media. A. E. Sobel, M. Sherman, J. Lichtblau, S. Snow, and B. Kramer.—p. 225.

*Self selection of diet. VII. The effect of age and pregnancy on selection. E. M. Scott, S. J. Smith, and E. L. Verney.—p. 281.

Amino Acids in Beef Protein. Several investigations have been made which show an apparent deficiency of essential amino acids in beef protein. It seemed desirable to test this deficiency by appropriate feeding trials with young rats. Comparisons were made of beef protein and egg protein. The supplemental values of seven amino acids—cystine, methionine, phenylalanine, leucine, isoleucine, valine, and tryptophane—for beef protein were determined. Results showed that cystine was as efficient as methionine in supplementing the protein in beef so as to increase its growth-promoting value to that of egg. In these experiments beef protein was found to be deficient only in cystine or methionine; there was no deficiency in phenylalanine, tryptophane, leucine, isoleucine, or valine.

Isoleucine Requirement of Infants. A survey of the literature indicates that, on a body weight basis, the nitrogen needs of the infant are four to five times higher than those of the adult. However, the available data do not

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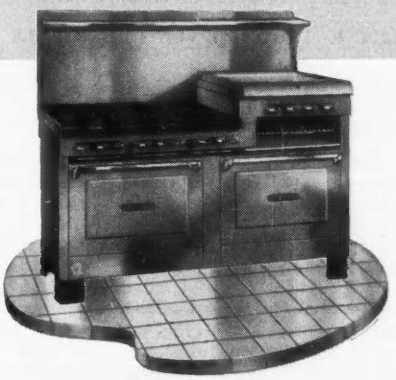

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reveal whether the higher protein requirements arise from a proportionate increase in all of the amino acids or from a limiting effect created by greater demands of the growing organism for one or several of the amino acids. The lack of and the need for this information, which is of obvious importance to practical infant dietetics and physiology of growth in general, led to the undertaking of investigations on the amino acid needs of the infant. One phase of the study, determination of the isoleucine requirement, is reported here. Five normal healthy male infants were the subjects. Measurements of the blood proteins during the experiments disclosed that, unlike the tryptophane-deficient diet, the isoleucine-deficient diet had no appreciable effect on the blood plasma protein and hemoglobin levels of the infants. This finding is of interest in view of the low-isoleucine content of these tissue proteins. Careful clinical examinations of the infants throughout the course of these experiments disclosed that feeding of an isoleucine-poor diet for periods of two to three weeks did not induce any detectable clinical symptoms in the infants. It was estimated that an infant requires approximately 90 mg. of isoleucine per kilogram of body weight each day.

Availability of Riboflavin. It is necessary to make a distinction between the total content of specific vitamins in food materials and the relative amount of those vitamins which can be utilized. Only when such information is available can adequate nutrition be attained. The experiments reported here were based upon this premise. Using a bioassay technique, these investigators studied the physiological availability of riboflavin in certain foods. Eight healthy women subjects participated in five experimental studies in which the relative availability of the riboflavin in ice cream, frozen green peas, and almonds was determined. During a twelve-day period when a weighed diet containing 2.4 mg. riboflavin was ingested, the urinary excretion of riboflavin was strikingly constant. Administration of 2 mg. riboflavin by retention enema on the morning of the eleventh day produced no change in the amount of riboflavin which appeared in the urine. A marked rise in the concentration of riboflavin of the urine occurred for all subjects when two, 500-mcg. portions of pure riboflavin supplemented the basal diet. When a supplement of 1 mg. riboflavin was supplied in the form of ice cream, the increment in urinary riboflavin was comparable to that procured by the pure vitamin, indicating that the riboflavin of ice cream was nearly as available as that of the pure vitamin. When either frozen green peas or almonds furnished 1 mg. of the supplementary vitamin, considerably less riboflavin was excreted in the urine than when the pure vitamin was administered. Less than one-half as much riboflavin appeared to be absorbed from these foods as had been absorbed from ice cream or the pure vitamin.

Absorption and Storage of Vitamin A. Vitamin A liver storage tests were used as the criterion for determining the relative absorption of vitamin A from oily or aqueous media. Experimenting with rats, it was found that liver storage was three times as great in groups fed the unsaponifiable fraction of fish-liver oil dispersed in water, as compared with the same fraction administered in maize oil. Evidence is presented that vitamin A is more effective when dispersed in aqueous media than in oily solutions. This indicates the importance of considering the nature of the diluent material in the biological evaluation of vitamin A.

Self-Selection of Diet. Previous observations made on rats six to nine weeks old showed that about 40 per cent of the animals refused to eat casein and that a majority disliked sucrose. Self-selection diets fed to younger and older rats formed the basis of the study discussed here. Weanling rats showed a marked lack of ability to select an adequate diet. Appetite for casein increased with age. Another change in appetite with age was in the relative preference of young rats for fat and their relative avoidance of sucrose. Older animals had a greater preference for sucrose and ingested less fat. Neither of these changes in appetite appeared to have an obvious explanation. During pregnancy, female rats increased their salt intake.

THE JOURNAL OF PEDIATRICS

Vol. 32, February, 1948

*Body size and growth rate of children with diabetes mellitus. C. K. Beal.—p. 170.
*Megaloblastic anemia in infancy. B. J. Siebenthal.—p. 188.

Growth of Children with Diabetes Mellitus. The purpose of this study was to analyze the growth records of a group of diabetic children as compared to growth records of normal children. Data were obtained from growth records on 201 diabetic children treated by the Department of Pediatrics of the State University of Iowa College of Medicine, between 1928 and 1945. Forty per cent of the records covered periods of not less than four years. The children were hospitalized for a sufficient length of time to attain ingestion of an adequate diet, freedom from glycosuria, and fair constancy of insulin dosage. Measurements of height and weight were recorded at the beginning and end of each hospitalization period. Each visit to the hospital was made at about a six-month interval. It was found that the children observed at the onset of the disease were of normal height for their age. However, if the diabetes was left untreated for any length of time, or if it was inadequately treated, the height of these children was found to be less than normal. It was also observed that children examined at the onset of disease weighed, on the average, 4.2 kg. less than the normal weight for their height. These findings emphasize the importance of prompt treatment of diabetes mellitus. The mean annual increment in height and the mean annual gain in weight for diabetics of various ages are discussed also.

Megaloblastic Anemia. This paper presents two cases of megaloblastic anemia in infants. Folic acid therapy was used with excellent response. Neither of the patients demonstrated splenomegaly or thrombopenia. Because megaloblastic anemia is a relatively common disease of white infants, and since complete and permanent recovery can be affected by folic acid therapy, the condition should be understood by all those caring for small children.

THE MILBANK MEMORIAL FUND QUARTERLY

Vol. 26, January, 1948

*The place of nutrition in the relationship between environment and health. H. D. Kruse.—p. 41.
A statistical study of cancer among diabetics. P. H. Jacobson.—p. 91.

Nutrition, Environment, and Health. The prevalent view of the etiology of deficiency states of disease is that faulty diet causes deficiency disease. This article is an attempt to review the factors that have contributed to this view and to demonstrate that many environmental factors influence nutrition and consequently health. A ratio is presented to show that the nutritive balance of a tissue is dependent on supply to the tissue and tissue requirement, and that numerous conditions may affect either of these factors. These conditions, in turn, alter the nutritive balance. This broader concept of deficiency states opens many new avenues for further study.

THE NEW ENGLAND JOURNAL OF MEDICINE

Vol. 238, February 26, 1948

*Infectious mononucleosis with intense jaundice of long duration. H. L. Abrams.—p. 295.

Infectious Mononucleosis. In the reports reviewed, the jaundice of infectious mononucleosis has usually been mild and its duration has rarely exceeded a month. Therapy of

Notes of interest from Borden's Quality Control Labs.

What Happens before Pasteurization?

When pasteurization first came to the dairy industry in 1906, it created, along with its great benefits to mankind, a heated controversy among dairymen.

One school of thought claimed that so long as milk was to be pasteurized, not too much attention had to be paid to its cleanliness at the source—the dairy, the methods of milking, or the cow herself.

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After this cooling test, and before final pasteurization, other purity controls are exercised. For example, at regular intervals a "laboratory pasteurization" is made of samples of incoming milk, which are then examined for thermoduric organisms.

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infectious mononucleosis should be revised in the light of present frequency of liver involvement. The diet should be high in calories, protein, and carbohydrate. Early ambulation should be restricted until laboratory evidence of hepatic insufficiency disappears.

PHYSIOLOGICAL REVIEWS

Vol. 28, January, 1948

*Pteroylglutamic acid and related compounds. T. H. Jukes and E. L. R. Stokstad.—p. 51.

*Conditioning factors in nutritional disease. B. H. Ershoff.—p. 107.

Pteroylglutamic Acid. This article presents the progress of knowledge of pteroylglutamic acid, now more commonly known as folic acid. Since the biological effects of pteroylglutamic acid have been observed under a variety of circumstances, different names have been attached to the vitamin. It has been known as "folic acid," "pteroylglutamic acid," "fermentation *L. casei* factor," and "vitamin B_c conjugate." This article contains a summary of work done with folic acid and its closely related derivatives.

Factors in Nutritional Disease. Malnutrition may be caused by conditions other than primary dietary deficiency. Such conditions include those which interfere with the absorption and utilization of nutrients, or those which increase the requirement, destruction, or excretion of nutrients. The review presented here is designed as a critical survey of pertinent material on the subject of these conditioning factors. The following topics are discussed: (a) factors interfering with absorption of fat-soluble and water-soluble vitamins, minerals, carbohydrate, fat, and protein; (b) factors causing destruction or inactivation of vitamins; (c) factors interfering with utilization; (d) factors that increase excretion; and (e) factors that increase body requirements (such as increased metabolism, pregnancy and lactation, detoxfication, and anoxia).

PUBLIC HEALTH NURSING

Vol. 40, February, 1948

*Meeting calcium needs in maternity. A. G. Keaton and V. Howard.—p. 93.

Calcium Need in Maternity. For those expectant mothers who cannot afford an adequate supply of milk, Mississippi county health departments now have available a preparation called C-D compound. This compound will provide each mother with 1.5 gm. of calcium and 1000 I.U. of vitamin D each day at a cost of 3 cents per month. The compound is an attractive white powder, neutral in taste, and comes packaged in ½-lb. lots to save package charges. It is not used as a substitute for milk.

SCIENCE

Vol. 107, February 27, 1948

*Nutritional requirements of the rat for reproduction and lactation. A. J. Sica and L. R. Cerecedo.—p. 222.

*Stability of solutions of pure ascorbic acid and of dehydroascorbic acid. L. P. Guild, E. E. Lockhart, and R. S. Harris.—p. 226.

Vol. 107, March 5, 1948

*Dehydroascorbic acid in frozen and cooked frozen vegetables. C. L. Bedford and M. A. McGregor.—p. 251.

Nutrition, Reproduction, and Lactation. Although it has been generally assumed that the requirements for lactation are greater, qualitatively, than those for reproduction, observations made by these investigators indicate that reproduction has dietary requirements as great, quantitatively, as lactation. Furthermore, it would seem that there are no specific dietary factors required for lactation only. An experiment on rats is reported. It appeared that regardless of diet the survival of new-born rats depended largely upon their weights at birth. The investigators suggest that the weights of the young at birth be used as the first indication of the adequacy of a diet, and that success in lactation in rats be calculated on the basis of those young and litters surviving on the third day of lactation.

Stability of Ascorbic Acid Solutions. There is a lack of agreement between the 2,6-dichlorophenol-indophenol method of Bessey *et al.*, and the 2,4-dinitrophenylhydrazine method of Roe *et al.*, in the estimation of ascorbic acid in foods. The study reported here involves a comparison of these methods in regard to their ability to measure the ascorbic or dehydroascorbic acid content of freshly prepared and aged solutions. The effects of oxalic and metaphosphoric acids on the stability of ascorbic and dehyroascorbic acids in solution were also investigated. Much of the lack of agreement between these methods is probably due to the fact that the Roe method measures the ascorbic acid originally present in the fresh sample, while the Bessey method measures only what is biologically active at the time of analysis.

Dehydroascorbic Acid in Vegetables. It is possible that dehydroascorbic acid forms in vegetables during preparation for freezing procedures and frozen storage. Therefore, determinations of dehydroascorbic acid have been made on vegetables in the fresh, scalded, and frozen-stored states. The frozen-stored vegetables were also analyzed after cooking to determine the net result of preparation on the various forms of ascorbic acid. Chard, spinach, peas, snap beans, and Lima beans were the vegetables used. Since cooking destroyed most of the dehydroascorbic acid present in these vegetables, the analysis seems to be of questionable value.

THE SOUTHERN MEDICAL JOURNAL

Vol. 41, February, 1948

*The important role of allergy in pediatrics. W. A. McGee.—p. 139.

Allergy in Pediatrics. In an attempt to see if it were possible to recognize signs or symptoms suggestive of allergy, the author studied the effect of various foods on 150 well babies. No infant referred for allergic problems was included in the survey. The greatest offending foods in causing allergy, in order of their frequency, were: orange juice, boiled milk, spinach, ascorbic acid, and mixed cereals. Various symptoms of allergic conditions are described, and the author concluded that it is possible, by careful monthly observations, to recognize allergic trends. The value of the passive transfer method of skin testing is stressed.

SURGERY, GYNECOLOGY AND OBSTETRICS

Vol. 86, January, 1948

*The influence of vitamin E on vascular disease. E. V. Shute, A. B. Vogelsang, F. R. Skelton, and W. E. Shute.—p. 1.

*Tissue protein depletion; a factor in wound disruption. S. A. Localio, J. L. Chassin, and J. W. Hinton.—p. 107.

Vitamin E and the Vascular System. It was noted that many arteriosclerotic cardiac patients who had been given tocopherols reported that feet and hands which had been cold and numb for years had suddenly become warm again. Tocopherols were also found to decrease capillary permeability and to increase low platelet counts. On the basis of these findings, 200 to 300 mg. of alpha tocopherol were given by mouth to patients with varicose ulcers of the legs, thrombophlebitis, early gangrene of the extremities, and thromboangiitis obliterans. With this therapy, ulcers healed rapidly and fresh thrombi quickly disappeared. The success of treatment was ascribed to improvement in local arteriolar circulation and to better oxygen utilization by the local tissues. In a fresh thrombosis, the clot itself literally melted away and the fibrin mesh was apparently resorbed. Larger doses of tocopherol were necessary for resolution of the older thrombi. It was necessary to continue treatment at high dosage levels. This study corrob-

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orates the work of others in showing that vitamin E has a significant role in the maintenance of a normal vascular system.

Tissue Protein. The level of tissue proteins was determined in samples of fascia, peritoneum, and muscle taken from patients who were undergoing laporotomy for benign conditions and in whom the state of nutrition was apparently good; and also on patients suffering from a debilitating disease in which poor nutrition was apparent. Blood serum proteins were also determined on these patients. The second class of patients had significantly lower tissue proteins than those who were well nourished, even though the serum protein levels gave little if any indication of protein deficiency. Depletion of the protein of the fascia seems to be an important factor in the etiology of wound disruption. It is emphasized that a normal serum protein concentration may often give the surgeon a false sense of security so that the patient may not be adequately prepared for major surgery with respect to protein reserves. Calculation of the probable protein needs of the pre-operative and post-operative patient should be based on the nature and duration of the lesion, the dietary history, loss of weight, and clinical history as well as serum protein. Gastrointestinal carcinoma and peptic ulcer should receive intensive pre-operative protein therapy. The term "hypoproteinism" is proposed to describe depletion of tissue protein whether or not this is accompanied by simultaneous depletion of serum protein.

BAKERS' HELPER

Vol. 89, January 24, 1948

The world beats a path to Merritt's beaten biscuit door.—p. 80.
*Formula balance of high sugar content cakes. R. Thelan.—p. 90.

Formula Balance of Cakes. Of great importance in cake baking is a knowledge of cake materials and their function in the cake. It is important that the proper type of ingredient be used for the purpose for which it was designed. For instance, special cake shortenings or emulsifying type shortenings are designed for high-sugar and high-moisture content cakes and some types of cake icings. This type of shortening is not suitable for frying or for use in some baked products, such as cookies and pies. Flours vary to an even greater extent than shortenings. The materials that make up a cake formula are either tenderizing materials, such as sugar, shortening, and leavening; or binding materials, such as flour, milk solids, eggs, salt, and moisture. The general characteristics of cakes containing an excessive amount of either tenderizing or binding materials are discussed; and a guide is included, which indicates the maximum and minimum amount of each product which can be used safely in making a cake of high-sugar content.

COLLEGE AND UNIVERSITY BUSINESS

Vol. 4, February, 1948

*Hold that price line! College unions actually are holding it.—p. 24.
When meat is scarce . . . selecting and cooking it become all the more important. W. J. Loeffel.—p. 30.

Food Prices in College Unions. This article contains a report of a study recently made by the Association of College Unions, based upon questionnaires returned by twenty-four unions of varying sizes in all parts of the country. The price of food in these unions has increased very little, if at all, in comparison to a rise of 25 to 30 per cent in the general retail food price indexes. Four tables are included. One gives a tabulation of union food service, price, and price changes. Another shows advances in utility rates from October, 1946 to October, 1947. A third table lists the advances in wages of students and full-time employees during the same year. The fourth table gives the average percentage increase of each dollar received, which was spent on raw food during the year. The circumstances which have made it possible for unions to operate without a loss are explained.

FOOD INDUSTRIES

Vol. 20, March, 1948

*Low temperature storage retains quality of dried fruit. W. R. Barger, W. T. Pentzer, and C. K. Fisher.—p. 67.
*Rating plan improves plant sanitation. M. H. Solworth.—p. 82.
Compression and storage of dehydrated foods. C. A. Magoon.—p. 114.

Storage of Dried Fruit. In 1945 a storage project was begun in order to determine the best practices for storing dried fruit. Specific objectives of the study were: (a) to find whether 32°F. was any better than, or as good as, 40°F. for storage; and (b) to determine whether humidity control was needed at these temperatures. All of the important dried fruits except dates for which information is already available, were included in the tests. The fruit was inspected at four- to five-month intervals during a storage period of twelve to fifteen months. Each type of fruit was graded for color, texture, sugaring, mold, and flavor. The moisture content of all the fruits was determined. Analyses were made for sulphur dioxide, ascorbic acid, and carotene in fruits that contained appreciable quantities of these constituents. The article contains colored photographs of several of the fruits, showing abnormalities resulting from improper storage. Among the specific recommendations made are those which state that a temperature of 32°F. and a relative humidity of 55 per cent are best for the storage of dried fruits.

HOSPITAL MANAGEMENT

Vol. 65, February, 1948

*Why not save that food you throw away each day? L. K. Anderson.—p. 94.
Speed, cleanliness feature Canadian hospital kitchen.—p. 100.

Saving Food in a T.B. Hospital. Food waste in tuberculosis hospitals is a matter of concern to many dietitians. Here is one instance in which much of the problem has been overcome. Dishwashing machines, suitable for sterilization of dishes and trays, were bought for each diet kitchen. A division was made between "contaminated areas" and "uncontaminated areas." After the service of trays, any food left over in the uncontaminated areas could be taken to other wards or returned to the main kitchen. In this particular hospital, the food saved by the method described amounted to $60 or more per day, or $21,900 a year.

HOSPITALS

Vol. 22, March, 1948

*Changing employee demands into job enthusiasm. H. E. Underwood.—p. 68.
*Waste control methods. Dietetics Comment.—p. 72.

Job Enthusiasm. If employees are to develop a willingness and capacity to work productively, the dietitian must know and practice the basic points that make for a good personnel program. The following points are discussed: (a) employment policies, (b) authority, (c) assignment of workers, (d) indoctrination, (e) hope for advancement, (f) working conditions, (g) attitudes of employees, (h) appeal to the motivating drives in employees, and (i) grievances.

Waste Control. This article describes how an effective system can be set up for weighing food waste. It takes only a minimum of planning and effort. First practical standards should be developed. They should include figures for maximum allowable edible food waste per meal, a clear definition of edible and inedible waste, and a recognition

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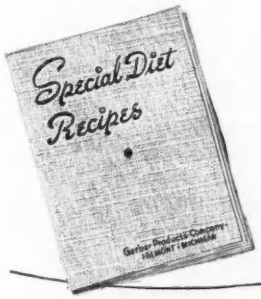

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of seasonal variation of inedible waste. The terms "edible waste" and "inedible waste" are defined. Definite routines for the separation and reporting of food waste are suggested. In addition, factors which contribute to food waste are pointed out, and a check list, covering twelve points, is included to show what phases of the food waste program need supervision.

ICE CREAM TRADE JOURNAL

Vol. 43, December, 1947

Utilizing the true lactic acid content to indicate ice cream quality. I. A. Gould and F. A. Potter.—p. 46.

*Evaluating the flavor of ice cream. D. V. Josephson.—p. 48.

The use of liquid sugar in ice cream. H. G. Dunlap.—p. 54.

Vol. 44, January, 1948

Research—the role of emulsifiers in ice cream. B. I. Maxurovsky.—p. 54.

The Flavor of Ice Cream. The development of the ice cream industry has indicated that ice cream should contain approximately 12 to 13 per cent butterfat, 10 to 11 per cent non-fat milk solids, about 15 per cent sugar, and 0.3 to 0.5 per cent stabilizer. However, it has never been shown that this is the ideal composition from the consumers' point of view. In studies conducted with groups of students during the past three years, it was found that 75 per cent of the group preferred the 14 to 15 per cent sugar level to one of 12 to 13 or 16 to 17 per cent. Concerning the butterfat level, it was found that the majority of the group (60 per cent) preferred the 12 per cent level to one of 10 or 16 per cent. As the serum solids were increased, percentages of preference increased. However, the problem of the composition of ice cream is complicated by the racial and economic status of different communities. In connection with the discussion of taste preferences, the weaknesses in present techniques of evaluating flavor are discussed. Suggestions are made which should be considered by research people whose job it is to determine what the average consumer wants in regard to ice cream.

U. S. Public Health Service Examinations for Dietitians

Announcement has been made of a forthcoming competitive examination for the appointment of dietitians in the Regular Corps of the U. S. Public Health Service.

Appointments of dietitians will be made in the grade of Junior Assistant Dietitian (Second Lieutenant), Assistant Dietitian (First Lieutenant), and Senior Assistant Dietitian (Captain).

An applicant for the grade of Junior Assistant Dietitian must be a U.S. citizen and a graduate of an approved college or university with a bachelor's degree in the field of dietetics. Preference will be given to candidates who have satisfactorily completed an approved dietetic internship. Application will be considered from interns who have completed three or more months of their training, and such interns who successfully pass the examinations will be considered for appointment after satisfactory completion of their internships.

Applicants for the grade of Assistant Dietitian must, in addition, present three years of postgraduate professional training or experience.

Applicants for the grade of Senior Assistant Dietitian must meet the requirements for Assistant Dietitian, with an additional four years of postgraduate professional training or experience.

Salaries are the same as for officers of the armed forces of corresponding grades, and range from $2955 per year for Junior Assistant Dietitian to $3915.50 per year for Senior Assistant, including subsistence and quarters allowances.

The examination consists of a written professional examination, a physical examination, and an oral interview. The written examination will be given on June 28, 29, and 30, 1948 (a three-day examination) at places mutually convenient to the applicant and the Service. Those candidates who obtain a passing grade in the written examination and who fulfill the physical requirements will be given an oral interview.

Appointments in the Regular Corps of the U.S. Public Health Service are permanent in nature and provide opportunities to qualified dietitians for a career in the fields of dietetic administration, therapeutics, clinical work, teaching of out-patients and dietetic interns, and research. Assignments are made with all possible consideration of the officer's demonstrated abilities and experience. All commissioned officers are appointed to the general service and are subject to change of station.

The U.S. Public Health Service is organized around a body of commissioned officers made up of people trained in the public health professions, who in time of war become part of the military services. It has four bureaus, one of which is the Bureau of Medical Services, which is the clinical arm of the Service. It, in turn, has four divisions: Hospital Division, Foreign Quarantine Division; Federal Employee Health Division; and Mental Hygiene Division.

About half of the Public Health Service hospitals have approved internships and/or residencies in one or more of the medical specialties. The Marine Hospital at Staten Island has an approved internship for dietitians.

Application forms and additional information may be obtained by writing to the Surgeon General, U.S. Public Health Service, Washington 25, D. C., Attention: Division of Commissioned Officers. Complete applications must be received by June 1, 1948.

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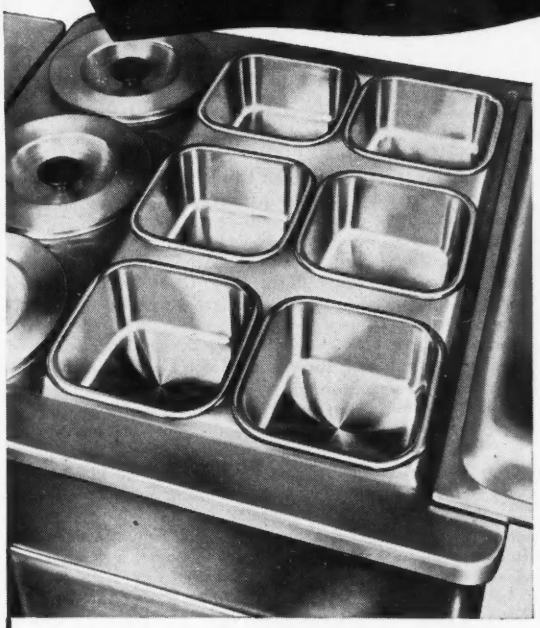

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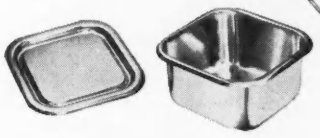

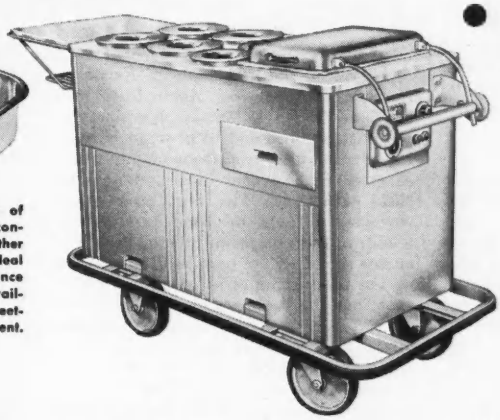

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News Notes

FAO will hold a ten-day regional meeting for all Latin American countries in Montevideo, Uruguay, beginning July 28. Delegates from eighteen Latin American countries and from France, the Netherlands, the United Kingdom, the U. S., and Argentina (which is not a member of FAO) will attend, and other interested organizations have been invited to send observers. The delegates will determine the gaps in existing knowledge about dietary habits, the state of nutrition, and the prevalence of deficiency diseases. They will plan measures to fill these gaps and attempt to develop national plans of attack and improve nutritional conditions. One of the basic measures to be discussed is the development and proper orientation of agriculture in Latin America. Also on the agenda will be consideration of special feeding programs for children and other vulnerable groups, education of the public in nutrition, food conservation and preservation of the nutrients, and training of nutrition workers. This conference will be the second of a series of regional conferences recommended by the FAO Geneva Conference last summer. The first was held in the Philippines in February and reported in the March issue of the JOURNAL.

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It is felt that one way to increase the world's animal resources is through improvement of known hardy types of animals that thrive under harsh climate conditions. A selective breeding program to produce such types is advocated in a new book, *Breeding Livestock Adapted to Unfavorable Environments*, by Dr. R. W. Phillips, which has been published by the Food and Agriculture Organization. Dr. Phillips is head of the Animal Industry Branch of the Agriculture Division of FAO. The study is concerned with types and breeds whose economic value has been demonstrated in tropical and subtropical areas, in semi-arid and plateau regions, and in wet hills and rugged range country. All known means of improving livestock under unfavorable conditions are reviewed. Since improved animals from favorable environment often fail to survive or reproduce in unfavorable climates, the alternative course is advocated of seeking maximum benefits in milk, meat, fabrics, skins, and work production from animals of adapted varieties. The book sells for $1.50 and is available from the Columbia University Press.

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In order to open up possibilities of raising the total world food supply, FAO is shipping seed potatoes to experiment stations in Italy and Yugoslovia and distributing hybrid corn seed to seventeen countries. Twenty-three varieties of potatoes were selected for shipment, and careful records of growth will be kept by Italian and Yugoslav experiment stations. The seed potatoes for the Italian experiment will be early yielding varieties which can be planted in non-irrigated areas during March and harvested in June. In Sicily, early potatoes are planted in winter for harvesting in May. In other areas, potatoes are planted in June and harvested in October. Before the war, Italy produced about 3 million tons of potatoes, receiving seed potatoes from Germany.

Seven varieties of grass seed and two additional samples of hybrid corn have also been sent to Italy for experiments in that country. In addition, tests of hybrid corn will be made in Afghanistan, Australia, Czechoslovakia, France, Greece, Hungary, Italy, Lebanon, the Netherlands, Norway, Poland, Portugal, Switzerland, Syria, the United Kingdom, and Yugoslovia.

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In March the first issue of *Economic Review of Food and Agriculture* was published by FAO. It will be a quarterly publication designed to provide current reports and interpretations of important aspects of the world food and agricultural situation. The first issue gives world-wide facts on food production, trade, and consumption. One article discusses the effects of partitioning of India on the production of jute, while another examines the various aspects of Czechoslovakia's agricultural economy. Copies of the first issue are available from the International Document Service of Columbia University Press for 50 cents. A regular subscription price has not been released.

Food Clinic Interns to Receive Graduate Credit. An announcement has been made that starting in January, 1948, Tufts College will allow 18 hours of graduate credit toward a master's degree for the training received by dietetic interns at the Food Clinic of The Boston Dispensary. This program, therefore, now offers the dietetic intern additional professional recognition as well as specialized training for food clinic work or work in public health or community agencies. The Food Clinic training course will be continued as formerly, and the courses of study at Tufts College will be planned to conform to the student's professional objectives as well as the extent or adequacy of her undergraduate training.

The time needed to earn a master's degree will be approximately one and a half years. This period of time will be divided into twelve months for training at the Food Clinic (ten months for those who have already completed a hospital internship approved by the A.D.A.) and five to six months for academic study at Tufts College. Applicants for internships at the Food Clinic wishing to obtain master's degrees will be shown preference.

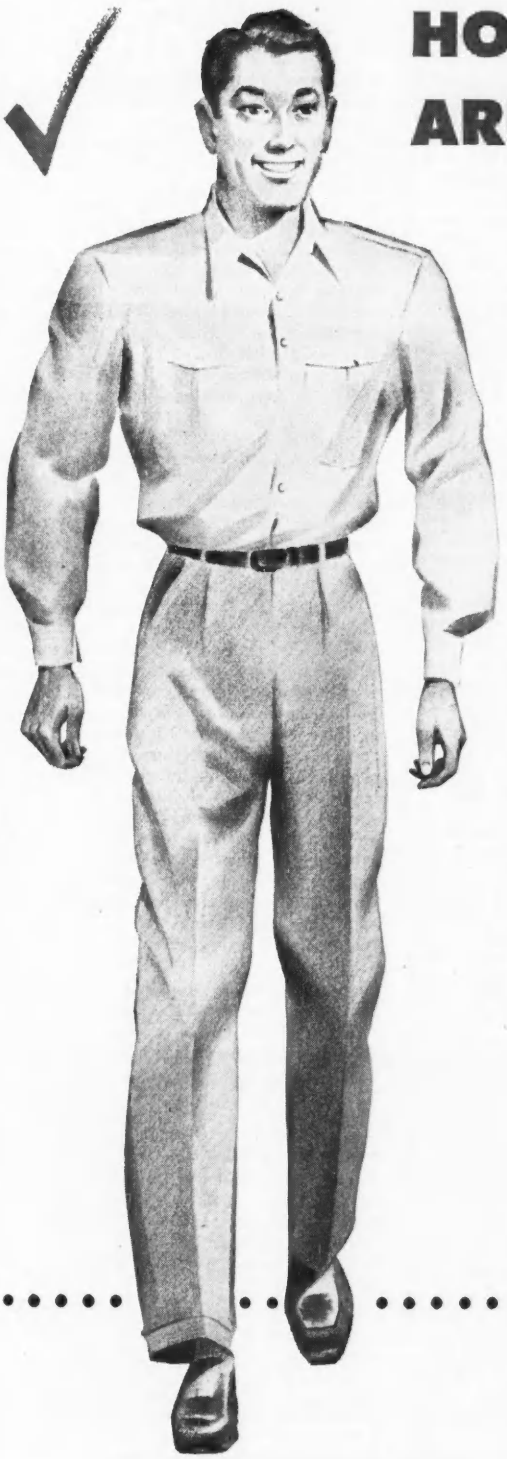
The tuition fee for the completion of the internship at the Food Clinic and the academic work at Tufts College will be $450, covering the charge for two terms of instruction. Rooms, or rooms with board, may be obtained within satisfactory commuting distance to The Boston Dispensary, or living accommodations can be arranged at Tufts College.

To help deserving students meet the expenses of such a course, a Schalorship Loan Fund in honor of Frances Stern, for many years head of the Food Clinic, is being established. Already several hundred dollars have been given for this purpose, and it is hoped that there will be more contributions.

Graduate Fellowships in Community Nutrition. The College of Home Economics of the University of Tennessee offers several graduate fellowships in community nutrition. These cover a twelve-month period and pay $1200 and free tuition. The training program leading to the degree of Master of Science in Community Nutrition, includes three quarters of work in residence at the University and one quarter of supervised field work in a health agency. Candidates are trained for positions as nutritionists with health and welfare agencies.

Academic requirement for admission is a baccalaureate degree in home economics with a major in foods and nutrition, or its equivalent, plus two years of experience, such as teaching, extension work, Farmers Home Agency work, hospital or other food service, or its equivalent. Interests and ability of the candidate are considered in accepting students for this training.

Dietetic Interns. The JOURNAL office recently received a copy of *San Antonio Dietetic Notes*, Volume 1, Number 1, which was prepared as a group project by the dietetic interns of Brooke General Hospital, Fort Sam Houston, Texas. It will serve as a newsletter to dietitians and future dietitians in San Antonio. In it were described some of the individual projects of the dietetic interns, as well as sketches of the staff at Brooke General Hospital and of dietitians in San Antonio.



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Course in Time and Motion Study. Teachers College, Columbia University, this year is offering a course in time and motion study applied to institution management. The work is supervised by Orpha Mae Thomas. In this course a technique for efficient large quantity food handling which is being used increasingly by hospitals, restaurants, and school lunchrooms is presented to students. A small group (chiefly food service managers) meet for one hour a week and spend additional time in the laboratory. They also examine different phases of activity in one of the Teachers College cafeterias.

Women's Bureau Conference. At the 1948 Women's Bureau Conference held in Washington, February 17 to 19, the American Dietetic Association was represented by Eva N. Ylvisaker of Christ Hospital, Cincinnati, and Marjorie Wood of the U. S. Public Health Service. Theme of the conference was "Women's Status—Yesterday, Today, and Tomorrow." Woman's present day role was considered from the standpoint of her place as worker, homemaker, and citizen. Some eighty-seven organizations sent delegates to the conference. Included in the roster of speakers were President Truman and Secretary of Labor, L. B. Schwellenbach. Other addresses were given by Gladys Dickason of the Amalgamated Clothing Workers of America; Dr. C. Mildred Thompson, Dean of Vassar College; Hazel Kyrk of the University of Chicago; Ordway Tead of the Board of Higher Education, New York City; and David Morse, Under Secretary of Labor. As one of the social functions of the conference, Mrs. Truman received official delegates at the White House.

Women's Progress in the Last Century. One hundred years of progress by the women of the United States was celebrated at a luncheon held on March 19 at the Waldorf Astoria Hotel in New York by the National Federation of Business and Professional Women's Clubs. The American Dietetic Association was represented at this function by Mary K. Bloetjes, who is president of the Greater New York Dietetic Association. The program featured speeches by four distinguished American women: Mrs. Franklin D. Roosevelt took as her topic "Women in World Affairs"; Marie Sellers, Director of Consumer Services, General Foods Corporation, talked on "Women in Business"; Dr. Mirra Komarovsky, Professor, Department of Sociology, Barnard College, discussed "Women in Education"; and Mary Donlon, Chairman, Workmen's Compensation Board of the State of New York, told about "Women in Government."

OSU Conference on Restaurant Management. The Fifth Annual Conference on Restaurant Management sponsored by Ohio State University was held March 21 and 22 in Columbus. The first session dealt with "Basic Policies and Problems in Industrial Food Service," with individual speakers discussing management, personnel, accounting, and food production problems. On Monday morning, March 22, Cloyd Steinmetz of Owens-Corning Fiberglas Company, Toledo, spoke on "Newer Methods of Selecting and Compensating Employees." He was followed by Dorothy Ronto of Eastman Kodak Company, Rochester, New York, whose subject was "Practical Employee Training." LeVelle Wood then spoke on "Tender, Crisp Vegetables."

In the afternoon a forum was conducted under the title "We Know How," with five speakers completing the title by discussing how to hire effectively, to cook, to sell food, to keep accounts, and to reduce food cost. The after-dinner speaker in the evening was Stephan Douglas, Sales Promotion Manager, The Kroger Company, Cincinnati, whose topic was "Merchandising Food—The Customers' Viewpoint."

Pharmaceutical Manufacturers' Meeting. A feature of Pan American Week proclaimed by President Truman was a three-day convention of the American Pharmaceutical Manufacturers' Association held in Havana, April 12 to 14. This was the first meeting held by this organization in a Latin American country. A highlight of the convention was the presentation of the A.P.M.A.'s research award to Dr. Dilworth Wayne Woolley, blind researcher from Rockefeller Institute, for his achievements in the field of nutrition, particularly in regard to the causes of pellagra.

National Health Assembly, May 1–4. Nutrition will be one of fourteen topics considered by the National Health Assembly which is meeting in Washington May 1 to 4. The assembly is being convened by the Federal Security Administration in response to a message from President Truman requesting the development of a national health plan setting goals that can be realized in the next ten years.

Dr. Frank G. Boudreau, Executive Director of the Milbank Memorial Fund and Chairman of the Food and Nutrition Board of the National Research Council, is chairman of the Nutrition Section of the Assembly. Discussions may cover such topics as extension of nutrition services to state health departments, training of more personnel, broadening of nutrition education, integration of the nutrition programs of the various governmental agencies, and the position of the U. S. in regard to international food problems. The Nutrition Section will be composed of about forty persons, including some of the leading professional people in the field, representatives of farm organizations, the food industry, and education, and leaders from various consumer organizations. Dr. Helen A. Hunscher, President of A. D. A., will be one of the delegates.

In addition to the nutrition section, thirteen other sections are meeting to consider other major phases of the nation's health needs. Their subjects are: Professional Personnel; Hospital Facilities; Local Health Units; Chronic Disease; Maternal and Child Health; Rural Health; Research; Medical Care; Community Planning; Rehabilitation; Dental Health; Mental Health; and Accidents.

National Conference on Family Life. The American Dietetic Association, as one of the sponsoring organizations, is sending four official representatives to the National Conference of Family Life being held in Washington, May 5 to 8. They are: Dr. Ercel Eppright, Chairman of the A.D.A. Professional Education Section: Ada Berning Pear, University of Maryland, College Park; Anne Stewart Miller, A.D.A. Legislative Chairman, Arlington, Virginia; and Eloise Trescher, Director, Food Clinic, Johns Hopkins Hospital, Baltimore.

The conference is being set up according to the four developmental periods of family life: premarital and early years of marriage; the family with small children; the family with adolescents; and the aging family. For each of these stages, parallel meetings will discuss the same problems in the following areas; economic aspects, social aspects, interpersonal aspects, and available resources. All official representatives will select the stage of family development in which they are particularly interested, and then attend the meetings of that group throughout the conference. The A.D.A., with four representatives, will participate in the work of each section. Plenary sessions will integrate the discussions of the four section meetings in terms of economic, social, and interpersonal problems of each stage of family life. As a special social function, Mrs. Truman is entertaining with a reception on the afternoon of May 5 at the White House. To this reception, one representative from each organization has been invited —Dr. Eppright being the A.D.A. representative to enjoy this honor.

Pacific Coast Regional UNESCO Meeting. The U. S. National Commission for UNESCO will conduct a Pacific Regional Conference in San Francisco, May 13 to 15. This will include the following states: Arizona, California, Idaho, Montana, Nevada, Oregon, Washington, and the territories of Hawaii and Alaska. This conference will be comparable to the first Regional Conference on UNESCO held in May, 1947, in Denver for the Mountain States. It will be recalled that Margaret Cowden Bernard represented A.D.A. at that conference.

Citizenship Conference. May 16 to 19 are the dates set for the Third National Conference on Citizenship to be convened in Washington, D. C. The A.D.A. will be represented at this meeting by Anne Stewart Miller, Chairman of the Legislative Committee. Three other members of this A.D.A. Committee will also attend sessions of the conference: Stella Gue, Emma Baughman Hall, and Jennie Barton Nichols.

AHEA Meeting. The 39th annual meeting of the American Home Economics Association to be held in Min-

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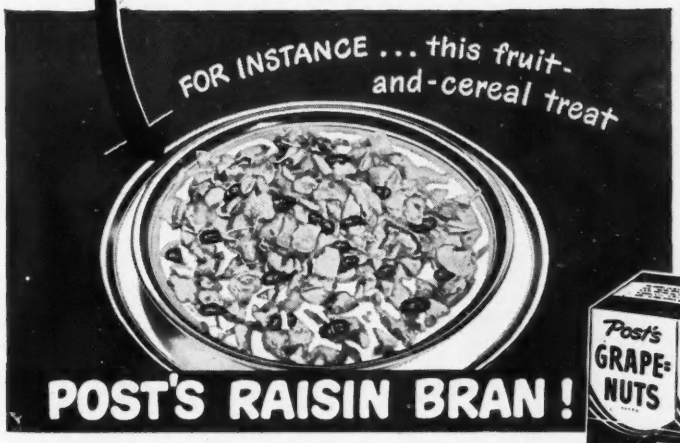

A GENEROUS BOWLFUL* of Post's Raisin Bran with milk and sugar supplies 200 calories and 10% of the protein** required daily by an adult! 21% of the calcium ... 17% of the iron ... 17% of the thiamine...and 14% of the niacin.**

* Post's Raisin Bran (1 oz.), milk (4 oz.), sugar (1 tsp.)
** Protein based on 70 g., niacin based on 15 mg.

P.S. EVERY POST CEREAL is either WHOLE GRAIN or restored to WHOLE GRAIN VALUES in the important nutrients: iron, niacin, and thiamine.

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neapolis from June 21 to 24 will have as its theme "The Home in the World Community." Sessions have been scheduled on the following topics: "Women's Responsibilities Today," "Visits with Our World Neighbors," "The International Economic Situation," and other phases of international cooperation with reference to the home. In addition to the regular program of speeches, there will be educational trips to Minneapolis' flour mills, the stockyards, the University of Minnesota campus, and a post-convention trip to the Rochester (Minnesota) Child Health Project. A highlight of the convention will be a formal dinner honoring the Bureau of Human Nutrition and Home Economics of the Department of Agriculture for twenty-five years of research service to homes and families.

World Health Assembly. Full-scale activity of the World Health Organization will begin with the first World Health Assembly scheduled to meet in Geneva, Switzerland, on June 24. The convening of this Assembly will mark the end of the interim period between the International Health Conference and the actual organization of WHO. Although at present only twenty-four members of the United Nations have become members of WHO, and twenty-six are required for the convening of the Assembly, it is hoped that two additional nations will join before June 24. In addition to the present twenty-four UN members, there are eight non-UN members which have joined. The United States is not a member. This is the first United Nation organization of which the United States has not become a member.

Community Education. The Department of Institution Management at the University of Washington, Seattle, recently presented a program to about seventy-five members of the International Stewards and Caterers of Seattle. The program was planned to cover certain phases of training in order to give a brief glimpse of the subject matter covered by the administrative dietetic training program. Margaret Terrell, Mildred Bonnell, and other members of the staff demonstrated the practical application of scientific training in the consideration of customer needs, quality production of food, and production controls. To show the value of training in personnel management, a group of dietetic interns produced a humorous skit which pointed out the value of good practice. Some of the restaurant managers have asked that the skit be repeated for the benefit of their employees.

This program provided an opportunity to inform the community about the profession of dietetics, and resulted in mutual respect and appreciation by the groups involved. It should be our professional responsibility to provide and foster such links with the community.

ICEF. Recently Dr. Martha Eliot of the Children's Bureau completed a study in Europe for the International Children's Emergency Fund. Last month Dr. Thomas Parran, former Surgeon General of the U. S. Public Health Service, left for the Orient to make a similar study, which will cover China, the Philippines, Indonesia, and other countries.

Material Available from Loan Library. The following publications and material have recently been added to the A. D. A. Loan Library and are available to members on a loan basis:

Manuel de Dietetique. By Sister Barcelo, Dietitian at Hotel Dieu, Montreal, Canada. (This book is written in French.)

Dietary Department forms used at Beth Israel Hospital, Boston.

Proceedings of the School Food Service Association Convention, held in November, 1947, at Dallas, Texas.

Two sets of posters prepared by the Veterans Administration, showing right and wrong methods of handling dishes in food service.

Sanitation Manual, prepared by the New York Restaurant Association.

Ruth Van Deman. On March 6 at the Johns Hopkins Hospital, Baltimore, Ruth Van Deman, for more than twenty years Head of the Information Division of the Bureau of Human Nutrition and Home Economics, passed away after a six-month illness. Miss Van Deman was well known to homemakers throughout the nation, having appeared weekly for more than ten years on the Department of Agriculture's Farm and Home Hour. She was also a specialist in putting results of research into comprehensible form, for she was responsible for all information released by the Bureau of Human Nutrition and Home Economics. Well known in the field, Miss Van Deman was a member of the American Home Economics Association and a frequent contributor to the *Journal of Home Economics*. She was a graduate of Smith College and took graduate work in home economics at Columbia University.

Florence N. Walls. On January 5, Florence N. Walls, dietitian and manager of the dormitory food service of Iowa State College, Ames, died suddenly at the college hospital. She had been connected with Iowa State College since 1908, when she first assumed the management of food service at Alumni Hall. As new dormitories were opened, she managed the whole system of dormitory dining rooms. In 1943, when the dormitories were used temporarily for Army Mess Halls, she resigned as manager and head, but continued on the staff until the time of her death. She had been an associate member of A. D. A. since June, 1939.

The British Journal of Nutrition. Cambridge University Press is currently publishing a new quarterly journal devoted to reports of original work in all branches of nutrition. Titled *The British Journal of Nutrition*, the first number appeared last September. The publication is owned and controlled by the Nutrition Society and in the future will incorporate the *Proceedings of the Society*, following completion of Volume 5. The *Proceedings* are now published separately. The University of Chicago Press is the agent for this journal in this country, single copies of which sell for $5. The price of Volume 1 is $15.

New Diet Manuals. *The Children's Hospital*, Cincinnati, has recently issued both a *Diet Manual* and a pamphlet titled *Feeding of Children, Infants, Young Children, Older Children.* The *Diet Manual* is a 5 by 6¾, sixty-seven-page booklet which is available to professional people at a cost of 75 cents. It is organized into five sections which cover "Normal Diet," "Modifications of the Normal Diet," "Weighed and Measured Diets," "Miscellaneous," and "Infant Feeding." A bibliography is also included, as well as an appendix which

New Appointments, Veterans Administration

The following hospital appointments of dietitians (not previously announced) have been made by the Veterans Administration.

Name	Position	Location
	Branch No. 3	
Eleanor Kerclausky	Staff Dietitian	Lebanon, Pa.
Gwendolyn Stanford	Staff Dietitian	Coatesville, Pa.
	Branch No. 6	
Barbara J. Alexander	Staff Dietitian	Dearborn, Mich.
	Branch No. 7	
Joyce L. Chamberlain	Staff Dietitian	Hines, Ill.
June E. Happel	Staff Dietitian	Hines, Ill.
Catherine B. Littell	Staff Dietitian	Hines, Ill.
Marceile J. Sander	Staff Dietitian	Hines, Ill.
Evelyn V. Schuber	Staff Dietitian	Hines, Ill.
Elaine D. Sobel	Staff Dietitian	Ft. Custer, Mich.
	Branch No. 8	
Mary A. Hartquest	Staff Dietitian	Des Moines, Iowa
	Branch No. 9	
Grace Nagle	Staff Dietitian	Springfield, Mo.
	Branch No. 10	
Geraldine L. Pogell	Staff Dietitian	New Orleans, La.
Martha H. Burns	Staff Dietitian	Gulfport, Miss.
Helen C. Flinn	Staff Dietitian	Temple, Tex.
Frances J. Osborn	Staff Dietitian	Biloxi, Miss.
Shirley Schwark	Staff Dietitian	Temple, Tex.
	Branch No. 12	
Elizabeth Murry	Staff Dietitian	Los Angeles, Calif.

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"Surgical patients in many instances tend to come to operations in a depleted state. There are many reasons for this: chronic gastro-intestinal disease . . . long-standing infectious processes . . . or loss of blood. The preparation of the patient for surgery includes nutritional preparedness. In the first instance, this means a good supply of *proteins* and carbohydrates.

"The operation itself and the reaction of the body to it in the immediate convalescent period are likely to increase breakdown of body protein. There seems little doubt that the recent stress upon maintenance and supplementation of dietary protein has had a beneficial effect upon the period of convalescence and the incidence of complications."*

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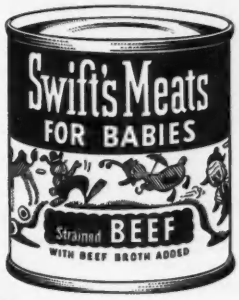
Palatable protein supplementation for patients on soft, smooth diets

When surgery or disease creates a problem in protein supplementation, many physicians now use Swift's Strained Meats. These all-meat products provide an abundant and palatable source of complete, high-quality proteins, B vitamins and minerals. Originally developed for infant feeding, the meats are strained fine—may easily be used in tube-feeding or for oral feeding in soft diets. Swift's Strained Meats are convenient to use—ready to heat and serve. Six kinds provide variety and tempting flavors that help combat anorexia: beef, lamb, pork, veal, liver and heart. 3½ ounces per tin.



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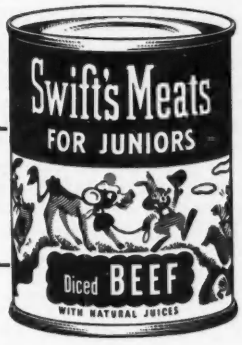
Also Swift's Diced Meats—for high-protein diets requiring foods in a form less fine than strained, these tender, juicy pieces of meat are highly desirable.



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gives a sample diet history and diet record.

The Children's Hospital pamphlet on child feeding discusses the food needs of children from infancy up to twelve years of age. The following age groups are considered: from birth to one year; from nine to eighteen months; from one and a half to six years; and from six to twelve years. Sample menus are given for each age group, as well as a "diet model" which gives specific amounts of foods recommended in the sample menus. In the section about older children (six to twelve years), recipes for six dishes are also included. This publication was prepared for use by mothers and is priced at 15 cents.

The fifth edition of the *Diet Manual* of Beth Israel Hospital, Boston, has recently come off the presses. It was planned for the use of dietitians, physicians, medical students, and student nurses, and the diets given are modifications of the normal diet adjusted to the individual's needs. Included in the discussion of "Construction of the Protective Diet" is a table giving the food constituents needed per day for the normal diet and their variation in therapeutic diets. The following sections, dealing with the various therapeutic diets, are divided by subheads, such as "Foods Allowed," "Foods Avoided", and "Sample Menu." Lists of food exchanges for protein, fat, and carbohydrate equivalents are given, as well as tables of the sodium and manganese content of foods, of basic ash of foods, and of the recommended dietary allowances.

A third new *Diet Manual* recently received in the JOURNAL office is from *Lima Memorial Hospital*, Lima, Ohio. This is a small booklet, 4½ by 6 in. in size, which was prepared in order to standardize the house diets, inform doctors who had been in service concerning the house diets, and give the staff physicians an understanding of the diet instructions given to patients. It is organized into three main sections—"House Diets," "Therapeutic Diets," and "Instructions to Patients." No detailed tables of food values have been included for books containing this information are available on the floors and in the dietary office. Discussion of each diet is divided according to the following topics: "Often Used," "Characteristics," "Foods Allowed," and "Avoid." Where applicable, additional topics are included. In the section dealing with the instruction of patients, the Basic Seven are outlined, and for each diet a sample menu pattern is given, as well as the purpose of the diet, the foods allowed, and those to be avoided.

Copies of these publications are available to members for loan from the A. D. A. Library.

Public Affairs Booklet on Diabetes. On March 29, the Public Affairs Committee released, as Public Affairs Pamphlet No. 138, a thirty-two-page booklet titled *Good News about Diabetes*, by Herbert Yahraes. In it are discussed the life expectancy of diabetic patients, symptoms, number of diabetics, causes and symptoms of diabetes, the "diabetes-prone" person, and treatment. Considerable space is devoted to the capabilities and limitations or handicaps of diabetic patients, with graphic charts showing the working time lost by diabetics, and the number of diabetics, both men and women, who can work full-time, part-time, and are unable to work at all. The booklet, which sells for 20 cents, may be obtained by writing to the Public Affairs Committee, 22 East 38th Street, New York 16, New York.

Food Supplies. The following foods are expected to be plentiful in May, according to the Production and Marketing Administration of the Department of Agriculture:

Fresh produce and fruits

Cabbage	Lemons
Cauliflower	Lettuce
Celery	Oranges
Grapefruit	Potatoes, Irish

Canned foods

Grapefruit juice	Sweet potatoes
Grapefruit segments	Tomato Juice
Juice, blended citrus	Tomato catsup
Orange juice	Tomato paste
Peas (lower grades)	Tomato puree
Pumpkin	

Fish and poultry

Fish (fresh and frozen)
Chickens
Ducks (fresh and frozen), in East North Central and North Atlantic regions)

Dried fruits and nuts

Figs	Prunes
Filberts	Raisins
Peaches	Walnuts
Pecans	

Miscellaneous foods

Eggs	Honey
Fruit spreads	Peanut butter

In addition, the following are expected to be *relatively* plentiful in May:
Lima beans (frozen)
Peas (frozen)

Food Spotlighted. The March issue of *Survey Graphic* is devoted entirely to the subject of food. Written primarily from the socio-economic standpoint, it stresses conditions in Europe and Asia where masses of people are starving or getting along on minimal rations. One interesting article is a "profile" on Sir John Boyd Orr, Director-General, of FAO.

News of State Associations

Alabama Dietetic Association. The Tuscaloosa dietitians organized a local Dietetic Association last November. They have written a 15-min. skit to be used in their recruiting program, which tells about different types of positions open for graduates of approved dietetic internships. It has been presented at the high schools in Tuscaloosa, Brookwood, and Holt. Copies of *Dietetics as a Profession* were given to the home economics libraries in these schools to use in their study of vocations.

District of Columbia Dietetic Association. This year's efforts of the D. C. Dietetic Association have been highlighted by two special meetings. The first was a program for lay members of the District of Columbia Diabetes Association on March 10. Colorful posters and exhibits were arranged to interest the guests, and a successful program of short talks was given.

The second occasion was the all-day annual meeting held at the Shoreham Hotel on April 10. On the program were the following addresses: "How Do You Measure Good Dietary Management in Hospitals," by Edgar C. Hayhow, President, American Hospital Administrators Association; "Peptic Ulcer and Antacids," by Dr. Nathaniel E. Rossett, Kennedy Veterans Hospital, Memphis; "Some Impressions of Public Health Problems Abroad" by Dr. J. R. Heller of the Federal Security Agency; and "The Modern Woman" by Ruth Crane of the American Broadcasting Company. Dinner speaker was Jennings Randolph of Capitol Airlines.

Idaho Dietetic Association. On February 7, the members of the Idaho Dietetic Association held their fourth annual meeting at the Kopper Kettle Tearoom in Boise. In the morning, Jane Gorsuch DeBuse, Idaho delegate to the A.D.A. convention in Philadelphia, reported on the convention; Herman Fisher, Manager of Dining Service at Northwest Nazarene College, Nampa, Idaho, spoke on the reorganization of his department; and Mrs. Johnette Byers, public health nurse who had been a Navy nurse during the war, told about the "concentrated" course in dietetics she received while in service. Following a delightful lunch, a business meeting was held at which the following new officers were elected: President, Bernice Morin; President-Elect, Eula Tombaugh; Vice-President, Sister Alicia Marie; Secretary, Marion Ruby Johnson; and Treasurer, Erma Nail Shropshire. The project for the coming months is to put *Dietetics as a Profession* in every high school in the state. The next meeting of the Idaho Dietetic Association will be held at Sun Valley.

Illinois Dietetic Association. The spring meeting of the Illinois Dietetic Association is again being incorporated in the Annual Tri-State Hospital Assembly to be held in Chicago at the Palmer House on May 5 and 6. A panel discussion on "Reduction of Labor Costs Through Efficient Personnel Procedures" is being planned for one session of the Dietary Section. On the panel will be Bertha Biltz, A.D.A. Administrative Adviser, who will speak on employee training; Joseph C. Spickler of A. T. Kearney and Company, whose subject will be work simplification; Wilma Robinson who will discuss equipment and plan-

ning; and a fourth member of the panel will talk on job evaluation.

The *Chicago Dietetic Association* met on April 28 at a dinner meeting at The Swedish Club. As a public relations activity, members brought as their guests for the evening their hospital superintendents.

On February 8, a group of dietitians met to discuss the organization of a local group in the Fox River area. On February 18, the group met again at St. Joseph's Hospital, Aurora, at which time a constitution and by-laws were agreed upon, and the *Fox River Dietetic Association* was founded. Officers elected are: President, Gertrude Fields; Vice-President, Katherine Crimmins; Secretary, Mary Margaret Beiber; and Treasurer, Lucy Booth.

Kentucky Dietetic Association. April 9 and 10 were the dates of the 14th annual convention of the Kentucky Dietetic Association, which was held at the Brown Hotel in Louisville. The Kentucky Association was pleased to welcome twenty-six exhibitors for its convention. The program included addresses on equipment, public relations, and diet therapy. Frank C. Lewis, Circular Metal and Equipment Company, spoke on "Modern Food Service Equipment," while Dr. P. E. Blackerby, State Health Commissioner of Kentucky, talked on "Hospital Construction in Kentucky." Dr. A. W. Homberger, Head of the Department of Biochemistry and Nutrition, School of Medicine, University of Louisville, chose as his topic "Diagnosing Today's Nutritional Problems." Another talk was that of Dr. Statie Erikson, Head, Home Economics Department, University of Kentucky, who spoke on "Folic Acid." Esther Ressegive, of Sky Chef, Inc., described food service for air lines at the Friday luncheon, and on Saturday the luncheon speaker was Hilda Threlkeld, Dean of Women and Professor of Education of the University of Louisville. The title of her speech was "How Old are You?"

Greetings from A.D.A. were extended by Mary McKelvey, Chairman of the A.D.A. Council of the House of Delegates while Marjorie Hall Siler talked on "Public Relations, An Individual Responsibility." Members of the Bluegrass Dietetic Association, the Purchase Dietetic Association, and the Louisville Dietetic Association, all extended welcomes to the dietitians attending the convention.

The *Bluegrass Dietetic Association* met February 24 at the U. S. Public Health Hospital in Lexington. Fonda Dickson conducted a tour of the dietary department of the various buildings. Dr. Kenneth Chapman, Clinical Director of the Hospital, gave an interesting talk on the work of the hospital. It is one of the few hospitals devoted entirely to the treatment of drug addicts. During the business meeting a report was given on the progress of the local project to interest the children of nearby schools in using more milk.

Minnesota Dietetic Association. Meetings of the *Rochester Dietetic Association* this year have been exceptionally interesting and well attended. In November, the group was informally addressed by Dr. Benjamin Spock, psychiatrist for the Rochester Child Health Project. His topic was "Common Feeding Problems of Childhood." In January, Dr. Russell M. Wilder spoke on "The Federal Food, Drug, and Cosmetic Law, and Efforts to Improve the Quality of Foods." In his talk, Dr. Wilder traced the history of the development of the Pure Food and Drug Act, and he stressed that the law as it is now written makes no provision for the nutritional quality of foods. To have it modified and improved, those who understand and appreciate nutritional quality of food must push such action.

The *Twin City Dietetic Association* has also had an active season. In December, the group met at the Midway Hospital in St. Paul. Dr. Frank Gouze, medical resident at Minneapolis General Hospital, talked on "Low-Sodium Diets in Treatment of Cardiac Disease." On Lincoln's Birthday, a social meeting was enjoyed at the Women's City Club in St. Paul. In March, Dr. Frank Gunderson, Vice-President of Research and Products Development of Pillsbury Mills, Inc., addressed the dietitians on the subject, "Foods and Nutrition Research Development."

Also in March, a number of dietitians

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Unequalled Dependability makes the Champion the first choice for any dishwashing pantry, afloat or on land, where *uninterrupted service* is of prime importance. All Champions, both belt conveyor and rack types, are built with extra strength at all critical points. Write for the Champion catalog.

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attended the Center for Continuous Study at the University of Minnesota, Minneapolis, for a three-day course on dietetics. The subjects discussed were dietary problems and treatment of the following conditions: diseases of the liver and biliary tract, gastrointestinal tract, cardiovascular and renal systems, infectious conditions, neurological impairment, deficiencies, surgical cases, and so on. The addresses were given by specialists in the surgical, medical, and neurological services of the University of Minnesota and Mayo Foundation.

North Carolina Dietetic Association. Charlotte was the scene of the fall meeting of the North Carolina Dietetic Association held November 21 and 22. On Friday, the afternoon meeting was devoted to administrative problems, with the following talks: "Modern Kitchen Equipment" by Kenneth O. Dupree of the Duke Power Company, Charlotte; "What Makes a Good Disinfectant?" by Frank A. Jacocks, Director, Division of Sanitation, State Department of Health; and "Techniques in Personnel Selection" by A. L. Bechtold, Personnel Director, Lance Corporation, Charlotte. Other speakers on the program and their subjects were: "Dietary Management in Treatment of Hemorrhage from the Upper Gastrointestinal Tract" by Dr. Graham Reid of Charlotte and "The Importance of Dermatoses to the Food Supervisor" by Dr. David G. Walton of Charlotte. A. L. Marcus of Atlanta, discussed "A Kitchen Layout from the Engineer's Standpoint," and other administrative talks covered food cost control and modern electric equipment. At a buffet on Friday evening, the exhibitors provided the food. This was followed by a showing of a film on multiple management by a representative of Lance, Inc., and four satirical skits. At the luncheon on Saturday, the speaker was Dr. J. Kingsley MacDonald of Charlotte, who talked on "Hobbies."

The following officers were elected at this meeting: President, Margaret Fern Ross, Charlotte Memorial Hospital; President-Elect, Elizabeth H. Miller, Superintendent of School Cafeterias, Greensboro; Vice-President, Rebecca Rogers, Watts Hospital, Durham; Secretary, Deliah Siler, Rex Hospital, Raleigh; and Treasurer, Edith Hinshaw, Home Demonstration Agent at Albemarle.

Ohio Dietetic Association. The *Stark County Dietetic Association*, which includes both Massillon and Canton, has elected the following officers: President, Mary Warmuth, Head Dietitian, Aultman Hospital, Canton; Vice-President, Reva Mills, Head Dietitian, Massillon State Hospital; Secretary, Mrs. J. C. Hays; Treasurer, Ellen Kline Ward, Massillon City Hospital. The Stark County Association was invited last fall to send representatives to the annual Postgraduate Day of the Stark County Medical Society, November 5. Five members attended this meeting and heard lectures by members of the faculty of the School of Medicine, University of Chicago. The group was entertained by the dietitians of Aultman Hospital, Canton, at Christmas time.

At the January meeting of the *Dayton Dietetic Association*, Mrs. J. V. C. Gregory, a leader of study groups in international affairs for the League of Women Voters, talked on the "World Food Situation."

Oklahoma Dietetic Association. The 10th annual convention of the Oklahoma Dietetic Association was held April 1 and 2 in Oklahoma City. Theme of the meeting was "Eat Wisely and Save More!" Bryce Roby of Goodner Van Equipment Company, Tulsa, spoke on "Purchasing Equipment and Supplies" at the meeting of the Food Administration Section. At another session, planned to interest Professional Education people, Dr. Helen B. Burton of the School of Home Economics, University of Oklahoma, Norman, spoke on "New Developments in Nutrition," followed by Dr. Margaret Randolph of the Home Economics Department of Texas State College for Women, Denton, whose topic was "Good Food Habits Mean Good Health." A panel discussion on "Trends in Community Nutrition" was held, as well as a meeting on Diet Therapy, which included the following talks: "Cancer Research" by Dr. Henry G. Gennett, Jr., of Oklahoma City, and "New Developments in Nutrition Research" by Dr. Robert W. MacVicar of Oklahoma A. & M. College, Stillwater. Following the annual banquet, the dietitians enjoyed a dance which had been arranged by friends of the Oklahoma Dietetic Association.

South Carolina Dietetic Association. On February 20, the South Carolina Dietetic Association met for a business meeting and dinner. Pete Kerhulas and Roy Pearce, both of whom are in the produce business in Columbia, South Carolina, were guest speakers. They stressed the fact that wholesale food handlers, are eager to help dietitians become better buyers, and also suggested the regular use of Department of Agriculture bulletins for interpreting price trends and quantities of produce which are available.

Tennessee Dietetic Association. The annual meeting of the Tennessee Dietetic Association was held on March 6 at the Peabody Hotel in Memphis. Speakers for the occasion included Dr. Helen A. Hunscher, A.D.A. President, who spoke on "Association Affairs in 1948"; Dr. Raymond L. Laird, Associate Professor of Preventive Medicine, University of Tennessee, whose topic was "Epidemiological Aspects of Amebiasis"; and Helen Stacy of the Children's Bureau, who talked about "The Dietitian—Community Leader for Better Health."

Texas Dietetic Association. The February issue of the Texas Dietetic Association *News Letter* was gotten out by the *South Texas Dietetic Association* Houston. In publishing this *News Letter*, the local associations in Texas take turns doing the work of gathering the news, sorting it, and getting it ready for the mimeograph.

The *Lubbock Dietetic Association* was organized in October, 1947, and now has a membership of approximately twenty-five. Reuby Thom Rhodes was elected Chairman and Helen Priebe was chosen Secretary. The program for the year has included three fall meetings and two meetings this spring.

The program for the year for the *South Texas Dietetic Association* opened with a dinner meeting in September at Kaphan's Restaurant in Houston. After introduction of new officers and discussion of the plans for the year, Frances Low led a round table discussion on "Problems of Dietitians." In October, the group met at the Twin Oaks Tea Room to hear Pierre de Tarnowsky of Mead Johnson and Company speak on "Protolysate and High Protein Feedings." In November, the meeting was held at the Houston Country Club with the compliments of C. R. Glazier and Company. Reports of the A.D.A. convention in Philadelphia were given. A Christmas party was enjoyed in December, and at the January meeting, Nancy Loar reviewed "News Books on Nutrition," following a Mexican dinner at the Junior League Luncheon Club. In February, Fay Anthis spoke to the group on "Newer Trends in Nutrition." A special feature of the meetings this year has been a brief resumé of "Interesting Food Facts This Month," which has been led by a different group at each meeting. In this way, all of the members benefit from the reading done by those giving the resumés. The South Texas Dietetic Association has a total membership of seventy-two this year.

The *Dallas Dietetic Association* met in February for a discussion of "The Dietitian in Four Fields." The fields described were school lunchrooms, institutional fields, commercial fields, and hospital dietetics. The Dallas group is planning to work with the Dallas Health Museum in setting up displays on nutrition and preparing newspaper articles on nutrition. The Dallas Association has prepared an interesting yearbook for 1947–48, giving local, state, and national officers, the year's program, the Constitution, and a list of active and participating officers.

Association Activities

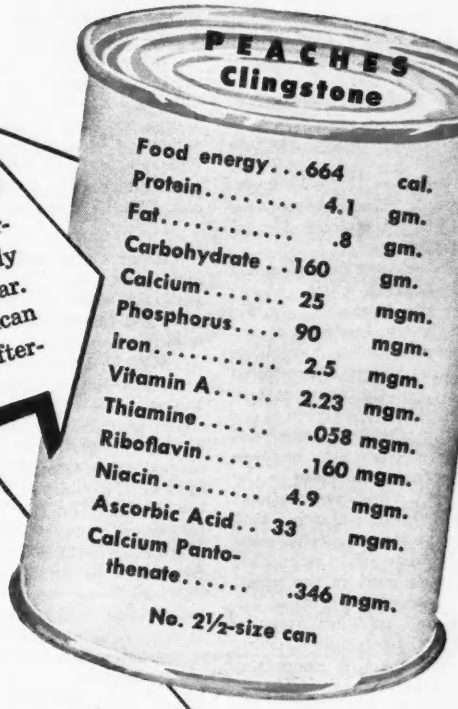
Ohio Contributes to A.D.A. Public Relations Program. On April 7, a check for $558 was received in the headquarters office of A.D.A. from the Ohio Dietetic Association. This sum was given to help defray the expenses of the public relations program being conducted for A.D.A. this year by J. Walter Thompson Company. The amount represented 50 per cent of the current rebate to the Ohio Dietetic Association by A.D.A. from dues of Ohio members.

A.D.A. Exhibits. In 1948, the American Dietetic Association will provide exhibit materials at a number of meetings of national organizations. Thus far,

HERE ARE SPECIFICS ON

WHAT'S IN A CAN OF PEACHES

A continuing research project to determine nutritive values in commercially canned foods is now in its sixth year. Studies conducted in leading American universities reveal average, net-after-processing values.



TO DATE, the results of this research, sponsored by the National Canners Association and the Can Manufacturers Institute, have been published in more than twenty scientific papers. The above figures for canned peaches are typical of data now available for the 41 commercially canned foods which represent almost 50% of our national consumption of all canned foods.

OUR NEW BOOKLET, "Canned Foods in the Nutritional Spotlight," gathers this material together and presents it in concise reference form. It tabulates nutritive values by individual foods (as with peaches, above) and in addition charts foods by rank as sources of six chief vitamins, three minerals, fat, protein, and carbohydrate. These figures are *net-after-processing* values. They represent the ready-to-heat-or-eat values for foods in cans.

THE MORE YOU STUDY the nutritional facts about canned foods—and consider their economy and availability—the more you will feel justified, we are sure, in recommending them to all those who look to you for nutritional guidance. For your free copy of our new reference booklet, address:

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New!
Complete Study
of the Nutritional Value of
41 Commercially Canned Foods

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the schedule includes the following conventions:

February 9–12—Chicago Dental Society, Chicago.
March 29–April 1—National Vocational Guidance Association, Chicago.
April 19–23—American Association for Health, Physical Education, and Recreation, Kansas City.
April 30–May 1—Career Day of the Chicago Home Economists in Business.
May 30–June 5—Biennial Nursing Convention, Chicago.
June 7–10—Catholic Hospital Association, Cleveland.
June 21–24—American Home Economics Association, Minneapolis.
September 13–17—American Dental Association, Chicago.
September 20–23—American Hospital Association, Atlantic City.
November 8–12—American Public Health Association, Boston.

In addition, arrangements have been made for many local and state groups to receive exhibits from the headquarters office of A.D.A.

Tie-in promotion work has been or will be done in connection with some of these showings, such as that done prior to the National Vocational Guidance Association meeting in Chicago in March. One hundred and sixty letters, together with the Vocational Guidance Kit assembled by the A.D.A., were sent to the presidents and secretaries of branches of the National Vocational Guidance Association. In this way these people were informed before their meeting about the exhibit and were urged to visit it. As a result, many requests for further information and material were received from those attending the meeting. Some 300 copies of *Dietetics as a Profession* were distributed at this meeting, and many favorable comments indicating interest in the profession were received.

Public Relations Representatives Meet Dietitians. Arrangements are being made for representatives of J. Walter Tompson Company, the organization which is handling public relations activities of the A.D.A., to speak before various local and state dietetic associations, in order to acquaint members with plans and progress being made. Already speakers from the J. Walter Thompson organization have appeared before the California and Maryland Dietetic Associations, as well as the Greater New York Dietetic Association, the Bay Section of the California Dietetic Association in San Francisco, and the Chicago Dietetic Association.

The presence of J. Hunter of the Chicago office of J. Walter Thompson at that meeting pointed up the importance of good public relations with allied groups.

At the April 28 meeting of the Chicago Dietetic Association, Chicago dietitians entertained hospital superintendents and representatives of the following organizations: Chicago Hospital Council, the Chicago Medical Society, the American College of Surgeons, and the American Dietetic Association.

Career Carnival in Cincinnati. The members of the Cincinnati Dietetic Association, the Home Economics Association, and the Home Economists in Business conducted a "Career Carnival" on April 13 for approximately 400 eleventh grade girls in the city and county schools. Deans, home economics teachers, vocational guidance people, and counsellors were also invited. The carnival idea was carried out to the fullest extent possible, even to the "barker" in the middle of the arena. Twelve gaily decorated booths were used to demonstrate the opportunities in the following fields of home economics: hospitals; community nutrition; child care; homemaking; radio and journalism; utility companies; food companies; equipment companies; textiles and merchandising; home demonstration work; restaurants and school lunchrooms; and teaching. In the booths were exhibited the handiwork and tools of the various fields represented, and successful dietitians and home economists were present to answer questions the visitors might ask. The whole program cost approximately $175, including some transportation, the setting up of the booths by a commercial company, and refreshments.

Student Day for Dietetic College Seniors. The Indiana Dietetic Association was hostess to forty-seven college seniors at a "Hospital Day" on February 21 at the Indiana University Medical Center inIndianapolis. The guests were all girls whose major is dietetics. They came from Indiana University, Purdue University, Earlham College, Butler University, DePauw University, and St. Marys of the Woods.

In the morning a clinic was held for the seniors at which five cases were presented by medical interns under the guidance of Dr. J. O. Ritchie, Chief of Medicine. The cases illustrated treatment by diet of obesity, diabetes complicated by ulcer, cardiac failure, and thyroid pathology, as well as tube feeding in cancer of the eosphagus.

After the clinic, the group divided into smaller groups to make ward rounds during tray service and a tour through the main kitchen. Opportunity was given for the students to observe patients being served modified diets.

Luncheon was served in the Doctor's Dining Room at the James Whitcomb Riley Hospital for Children, Lute Trout, Head Dietitian and Director of the approved internship at the Medical Center, presided. Dr. John Van Nuys, Dean of the Medical School, extended greetings to the guests, and Grace McMahon, President of the Indiana Dietetic Association, spoke about the American Dietetic Association. Martha Corey, a dietetic intern, talked on internship training, and J. B. H. Martin, Administrator of the Indiana University Medical Center, took as his subject, "What the Administrator Expects of a Dietitian."

New York City. Mrs. Mary K. Bloetjes, President of the Greater New York Dietetic Association, spoke at the December meeting of The Greater New York Hospital Association on the qualifications, work, and problems of the hospital dietitian. In addition to discussing dietitians in the hospital field, Mrs. Bloetjes pointed out factors which must be considered by administrators if they are to obtain the number of qualified dietitians needed. Not only was the cooperation of these administrators asked, but the work which the A.D.A. is doing on public relations and vocational guidance and the availability of literature, such as the brochure on the hospital dietitian, published by the Greater New York Dietetic Association, was emphasized.

Career Clinic in Houston. The South Texas Dietetic Association, Houston, in November, sponsored, as a vocational guidance project a "Career Clinic" for high school students. The suggestion for the project came from the assistant superintendent of Houston schools, and with his cooperation the publicity preceding the event was excellent. Notices were posted on the school bulletin boards, mimeographed sheets were sent to each classroom, and the teachers urged the students to attend.

The Career Clinic was held on a Wednesday evening at the Y.W.C.A. Students, their parents, and the school counselors were all invited. Fay Anthis, Director of the Home Economics Division of the University of Houston, presented the overall picture of the field of home economics as a vocation. She was

Army Announcements Concerning Personnel

The following Medical Department Dietitians were promoted during the month of February:

Major to Lieutenant Colonel

Burns, Helen C., R-10000

First Lieutenant to Captain

Sleddon, Barbara M., R-949
Stack, Mary E., R-38

Second Lieutenant to First Lieutenant

MacKellar, Rose M., R-190
Barefoot, Helen R., R-2504

The War Department has released the following official list of names of Medical Department Dietitians (not previously announced) who have been separated from service:

Captain

MacLean, Helen C., R-663, 72 Magnolia Ave., Magnolia, Mass.

First Lieutenants

Carr, Margery W., R-2391, 523 Birch St., McMinnville, Ore.
Heisler, Virginia C., R-1213, 22 E. Summerfield Ave., Collingswood, N. J.
Marshall, Elizabeth C., R-2157, 1678 Lenox Ave. Miami Beach, Fla.
Nye, Beulah E., R-2409, Litchfield, Calif.

First Lieutenant Mary C. Hickman, R–10050, previously reported as separated from service, has been appointed in the Regular Army and was ordered to Active Duty.

followed by two speakers who dealt with specialties within the field—Margaret Sartor, Chief Dietitian, Hermann Hospital, and Sue Foote, Home Service Advisor, Houston Natural Gas Company, both members of the South Texas Dietetic Association, who spoke about their respective fields. The discussions covered the following points: scope of the field; duties and responsibilities; possibilities of getting a job and of promotions. The response in attendance at this Career Clinic was so good that a similar clinic was held in April.

Vocational Guidance in Virginia. On March 24 and 25, the Virginia Dietetic Association participated in the meeting of the Virginia Conference of Guidance and Personnel Workers held in Richmond. A vocational guidance exhibit, sent from A.D.A. headquarters office, included vocational material of the A.D.A. The exhibit also contained several posters showing activities of Virginia dietitians. Literature available for distribution included "Dietitians in Demand," the "Descriptive Folder," and the "List of Publications and Reprints."

Another feature of the Virginia Association's plan to interest vocational workers was a mimeographed booklet distributed to those attending the conference. This booklet contained a message from the president of the Virginia Dietetic Association inviting guidance workers to visit the exhibit booth, told of the need for dietitians, and suggested that Virginia dietitians and dietetic interns were available to speak to groups in high schools and colleges. A list of A.D.A. members in Virginia was also included.

News of Advertisers and Exhibitors

Calavo Growers of California now have available for distribution two, 8½ by 11 publications which should be helpful to food production people. One is a folder titled "Nutritional Values of Calavo Avocados" in which are included two "stuffers"—one a table showing the nutritive analysis of avocados as found by Mattill and by Jamieson and co-workers, and the other a comparison of nutritive values of fruits and vegetables commonly used as salad ingredients. The second publication is a booklet, *The Calavo Manual*, in which information is given on the care, preparation, and serving of avocados, as well as recipes for 100 portions. A guide is included to show how to test for ripeness of avocados, as well as a table indicating the weights of avocado suitable for a number of different uses. . . . *Reid, Murdoch and Company* has announced that on July 1 it plans to open a branch in Minneapolis, where a four-story warehouse has been leased. The opening of this branch is in line with the company's expansion program designed to serve better both the institutional customers and retail merchants in the Twin City area. . . . The Home Economics Division of National Canners Association has prepared a sheet of "Canned Food Tables." On one side of the sheet is a table giving the percentage contribution of a 4-oz. serving of forty-two different canned foods to the recommended dietary allowances. On the other side is a table giving services per unit for various canned foods in common can sizes. The foods are divided into the following groups: fruits, juices, vegetables, soups, meats, and fish and shellfish. Another publication prepared by this organization is *Canned Foods in Modern Meals*, which is an eight-page booklet, punched for loose leaf binding, that was prepared for use in foods classes. It includes the menu, work schedule, and market order for a 30-min. meal featuring canned foods, as well as basic information on canning processes, distribution of canned foods, labeling, nutritive value of canned foods, and use and storage of canned foods . . . *Pfaelzer Brothers* have announced the opening of a separate division for their food specialty items, consisting of dehydrated soups, canned chili con carne, corned beef hash, crab meat, tuna, and many other such items. . . . . Two layouts for a school lunchroom and kitchen serving 600 students, together with a suggested list of equipment, are being distributed by the *American Gas Association*. This material was prepared by Owen Webber, Food Service Consultant, for the 1947 meeting of the School Food Service Association in Dallas. In addition, lists of equipment for a school lunchroom seating 250 and feeding a maximum of 750 pupils and for one seating 165 and feeding a maximum of 500 students are included. . . . *The G. S. Blodgett Company's* new brochure, *Case Histories of Successful Mass Feeding Installations*, includes information on the essentials of kitchen planning and information about gas-fired ovens. Examples of installations in hospitals, school lunchrooms, in plant feeding units, colleges, restaurants, hotels, and department stores are shown, together with layouts of the kitchens. Two other Blodgett publications will be particularly interesting to dietitians. One, a twelve-page, two-color booklet, titled *Modern Hospitals, Modern Feeding. Modern Ovens*, shows installations of Blodgett equipment in various size hospitals, including both new and modernized kitchens. In this booklet, too, layouts of the kitchens are shown. The third Blodgett booklet follows the same pattern, but presents installations and layouts of school lunch and college and university kitchens . . . *Campbell Soup Company* on April 5 purchased the V-8 business from *Standard Brands Incorporated*. The transaction involves the transfer of trademarks and manufacturing facilities involved in the production of V-8 Vegetable Juice, V-8 Tomato Catsup, and other related products. Campbell Soup Company will continue to manufacture V-8 products . . . *Cereal Institute* has announced the appointment on April 1 of Marguerite Downing as Home Economics Director. In this position Miss Downing will be in charge of the Institute's educational activities in the home economics field.

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CREAM OF RICE { gives "more available caloric energy" / is "more easily digestible" and / gives "nutritional energy more rapidly"

An independent research service has just completed calling specifically to the attention of every listed pediatric specialist in the country material from the September issue, Archives of Pediatrics, and asking in the terms of this article (which reports on 25 "best selling" cereals) "whether your own pediatric experience inclines you to agree that such a finely milled rice can be expected:

(a) to give 'more available caloric energy'
(b) to be 'more easily digestible'
(c) to give 'nutritional energy more rapidly'"
i.e., than the wheat, oat, corn, "baby" cereals.

Of the 191 pediatricians who believed their own experience justified a definite judgment *on all three* queries, 156—81.7%—said yes *to* all three.

Of the 227 answering query (a) definitely 192—84.6%—said yes.
Of the 248 answering query (b) definitely 212—85.5%—said yes.
Of the 220 answering query (c) definitely 178—80.9%—said yes.

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